THE JOURNAL

OF THE

Department of Agriculture

OF SOUTH AUSTRALIA.

No. 4. NOVEMBER, 1916. Vol. XX.

Published Monthly by the Department of Agriculture.

Edited by H. J. Finnis.

CONTENTS.

All communications to be addressed:

"The Editor, Journal of Agriculture, Victoria Square, Adelaide."

POINTS FOR PRODUCERS.

An Alien Weed.

In the May, 1916, issue of the *Journal*, attention was directed to the occurrence at Renmark of an alien weed which threatened to become as serious a pest as the Bathurst Burr. Realising the danger, the Government immediately took steps to cut out and burn the weed, which is known botanically as *Xanthium Canadense*. It is only reasonable to assume, however, that some of the plants escaped notice, and matured. As the area on which the weed was first discovered is subject to inundation, there is every reason to fear that any seeds which escaped destruction would be carried down stream, possibly finding their way through the various irrigating plants on to the reclaimed areas.

Land holders on the banks of the Murray will be doing a service to themselves and to the State by keeping a sharp look out for this unwelcome immigrant. Readers are referred to page 898 of the May issue, on which will be found an illustration of the plant in question.

Publication Received.

"Money in Bees in Australasia," by Tarlton.—Rayment, Whitcombe, and Tombs, Limited.

Conference of Dairy Factory Proprietors.

At a recent meeting of the Advisory Board of Agriculture, it was suggested that good might result from an attempt to hold a conference of representatives of various dairy factories in this State. It was thought that a gathering of interested parties, for the purpose of giving consideration to questions affecting the dairying industry, more especially from the standpoint of the factory manager, might tend to the attainment of a higher standard of the product, and generally make for a higher status for the industry. It is proposed that the gathering should be primarily of an educational character, consideration being given more especially to the technique of dairy produce manufacture, in addition to the marketing of produce. Various factory proprietors throughout the State have been communicated with in respect to the conference, the success of which will, of course, depend very largely upon the measure of support granted by those interested.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

VETERINARY INQUIRIES.

[Replies supplied by Mr. F. E. PLACE, B.V.Sc., M.R.C.V.S., Veterinary Lecturer.]

"T. E. D., Kingscote (K.I.), has a mare with film on eye from injury; eye does it seem to have been pierced.

Reply—Probably if a few drops of a solution of 2 grains of nitrate of silver 1oz. of distilled water are applied to the eye daily it will improve, or a few rains of boracic acid may be blown in once or twice a week. It will probably take me weeks clearing. Do not be led into blowing in sugar or powdered glass.

"H. B.," Sevenhills, had a horse which was feeding in paddock; galloped in l night, shivered, staggered, and died in four minutes.

Reply—In all probability from over distension of the stomach, due to rapid fer- entation induced by the gallop. Many such cases come to hand at this time of ear, and the actual cause of death is mechanical interference with the heart beat.

"H. C. P.," Honiton, seeks advice in artificial rearing of foal.

Reply—With feed as plentiful as it is now, the mare should be able to bring p the two foals without extra feed, but if any is given a few pounds of bran nd crushed oats daily will be best. Cow's milk should be diluted by one-third ater, and a good pinch of sugar of milk dissolved in each pint. It should be el warm, through a teat. Condensed milk is not so good as cow's, and at present rices too expensive. Five parts of water to one of milk may be given. The oal should be brought on to a little crushed oats and bran as early as possible, and hen he takes to them the milk may be gradually decreased, and boiled linseed elly substituted for some of it. Many foals so reared are quite as well grown s those brought up on their dam.

"A. K.," Tiparra, Paskeville, has a mare 9 years, which was off color, tucked p, driven 30 miles as a remedy, sluggish, off appetite; lay down, but not in pain; ecovered in three days; water quite red.

Reply—The condition is known as hæmoglobinuria, and is the result of excessive nitrogenous waste in the system. You were lucky to get a recovery. Frequently on a journey there is complete paralysis of the hindquarters. A satisfactory treat- ment is small doses of turpentine in linseed oil. In your case no further treat- ment is necessary.

"W. A.," Wokurna, reports horses troubled with sore shoulders.

Reply—There seems to be poor horsemastership somewhere. Clean the shoulders after work every evening, beat out the collars at least once a week, for the worst have two collars for alternate days. Stop oats if given. Read "Sore Shoulders" in *Journal* last year. Give a tablespoon of sulphur once daily to each horse for a week. Mix two ounces white lead and a tablespoon pure carbolic acid in a pint of neats-foot oil and dress shoulders and collar before work, at dinner time, and shoulders after work regularly. Offer a bonus to the teamster that gets his horses well in the shortest time.

"F. B.," Carrow, has a mare affected with rash which disappeared in about 12 hours.

Reply—The trouble was nettle rash, or *Urticaria*, which occurs generally in the spring, and is due to disorder of the blood. It is well to give a tablespoon of sulphur in the food for a week when it attacks an animal.

"E. R.," Cleve, has a cow with swellings like boils on udder.

Reply—The condition is cowpox. Dress twice a day with boracic ointment, and paint the worst with collodion. The milk may be used if boiled first.

"J. G.," Warratta Vale, reports sows as being itchy, weak in legs, with hard udder.

Reply—The troubles arise from worms, lice, and chill. Rub over with kerosine; rub warm lard into udder, and dress the ulcer with sulphur one part, boric acid seven parts. Give daily in food a tablespoon of a mixture of equal parts sulphur, saltpetre, and charcoal, and give cinders regularly in feed.

"J. B. T.," Sutherlands, had a colt 2 years, castrated; taken good care of; three weeks later enormous swellings occurred, and the animal died.

Reply—It is much better to let colts run out after the operation, as the exercise enables a good drainage to take place. In this case death resulted from absorption of septic matter.

"A. A.," Mount Hope, has a colt 3 years, with chaff in eye.

Reply—To make sure whether the chaff is still there, throw the colt, press on upper lid with first finger and lower with thumb and look, for often a piece of chaff goes but leaves its shape on the opaque eye. If still there take a pair of tweezers or a hairpin and use as forceps. A little 5 per cent. solution of cocaine assists in this performance. Afterwards dress the eye daily with a little solution made by dissolving 2 grains of nitrate of silver in an ounce of distilled or rain water. It will take some weeks for the eye to clear.

DEATH OF FOALS.

NAVEL OR JOINT ILL.

From different parts of the State come reports that losses are occurring amongst young foals. The symptoms, as given by an inquirer on Yorke Peninsula, are for the animals, 2 days or a fortnight after birth, to become very lame, with swellings on the knees, stifles, &c. They resist treatment, and if the swellings are lanced, foetid pus exudes. In the majority of cases the affected beasts die.

Mr. F. E. Place, B.V.Sc., M.R.C.V.S. (Government Veterinary Lecturer), states:—"This is navel or joint ill, technically, *Omphalo thrombo-phlebitis*. It is caused by a specific organism which obtains entry to the system through the navel. It is hard and expensive to treat; practically the only drug of any use is acetozone. Twenty grains are dissolved in pure water, and the navel and lanced sores dressed with the solution (½pt. water) twice a day. Two tablespoons of the solution should be given as a drench twice a day as well. The disease is communicated both by dam and pasture, so when prevalent, as in this case, all foals' navels should be dressed either with tincture of iodine or a paste of equal parts chlorinated lime and boric acid, as soon as they are dropped, and if the navel remains moist, as often as required to dry it. In-foal mares should be removed from paddocks where it occurs, and these and yards, &c. should not be used for foaling mares for at least two seasons."

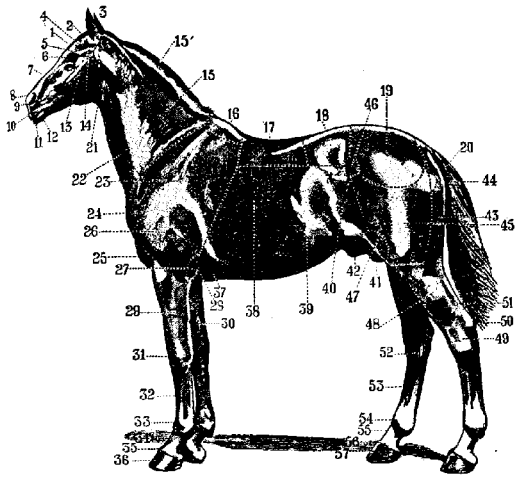

Fig. 1.—Exterior of the Horse: Side View.

REFERENCES.

1 Forehead.
2 Forelock.
3 Ear.
4 Supra-orbit.
5 Eyrebrow.
6 Eye.
7 Nose.
8 Nasal Peak.
9 Nostril.
10 Upper Lip.
11 Lower Lip.
12 Chin.
13 Cheek.
14 Temple.
15 Neck.
15' Crest.
16 Wither.
17 Back.
18 Loins
19 Croup.
20 Tail.
21 Throat.
22 Cervical Groove.
23 Shoulder.
24 Shoulder Point.
25 Breast.
26 Upper Arm.
27 Elbow.
28 Point of Elbow.
29 Forearm.
30 Chestnut.
31 Knee.
32 Canon.
33 Fetlock-joint.
34 Pastern.
35 Coronet.
36 Foot.
37 Brisket.
38 Chest.
39 Abdomen.
40 Flank.
41 Testicles.
42 Sheath.
43 Buttock.
44 Point of Buttock.
45 Thigh.
46 Haunch.
47 Stifle.
48 Leg or Gaskin.
49 Hock.
50 Point of Hock.
51 Tendo Achilles or Ham-string.
52 Chestnut.
53 Canon.
54 Fetlock-joint.
55 Pastern.
56 Coronet.
57 Foot.

ROSEWORTHY AGRICULTURAL COLLEGE.

SIXTH REPORT ON THE PERMANENT FIELD EXPERIMENTS, SEASONS 1904-1915.

[By WALTER J. COLEBATCH, B.Sc., M.R.C.V.S., Principal, Roseworthy Agricultural College, and R. C. SCOTT, Assistant Experimentalist.]

(Continued from page 195.)

(B)—MANURIAL EXPERIMENTS.

1. PHOSPHATIC MANURES.

The experiments in progress concerning phosphatic fertilisers may be divided into three sections—

(*a*) Those that aim at discovering the effects of the residues of superphosphate on a crop of wheat when applied to the fallow in the previous year.

(*b*) Those that bear upon the direct and indirect effects of superphosphate when applied to wheat crops grown under two-course and three-course rotations.

(*c*) Those that have been designed to ascertain the merits of basic slag as a fertiliser for wheat comparatively with more soluble forms of phosphatic manure.

(*a*) REVERSION PLOTS.

The first group of plots, which are known as Reversion Plots, were started last year in response to a number of inquiries as to the amount of manure that should be applied with seed sown on land that had failed to produce a crop the year before. It was generally considered that crops sown in 1915 on the failures of the drought year—1914—would not require a full dressing in order to ensure maximum returns, provided always that the 1914 application exceeded ½cwt. per acre. This conclusion was based on the knowledge that soils, generally speaking, possess high retentive powers for phosphoric acid. Even in years of heavy rainfall, the loss of this ingredient through leaching is inappreciable, except in soils of an open, porous nature, such as sands and light sandy loams. Nevertheless, it was not deemed wise to advocate the complete omission of superphosphate in 1915, even where heavy dressings, up to 2cwts. per acre, were habitually applied, for the reason that a readily soluble form of phosphoric acid at the time of

germination is essential to a quick even braird, and the presence of such a stimulant could only be secured by the application of a further quantity of superphosphate with the grain. It was thought, however, that as long as sufficient water-soluble phosphoric acid to meet the initial demand of the young plant was supplied, the crop might be expected to satisfy its requirements in the matter of phosphoric acid by turning to account the unused portion of the 1914 dressing. The difficulty was, however, to form an idea as to the minimum proportion of the normal quantity of superphosphate that is necessary to promote a satisfactory germination and rapid early growth.

It is probable that the opinions expressed erred on the cautious side, as it would naturally be felt by those called upon to pronounce a verdict that much more harm would be apt to result from under-manuring than from the use of more than the crop required. It was considered, however, that something more definite was needed, in order to guide us in the matter, and we, therefore, determined to test the residual effects in permanent plots in accordance with the following scheme:—

1915.		1916.		1917.
Bare fallow ..	1cwt. superphosphate..	Wheat ..	No manure ½ cwt. super. 1 " " 2 " "	Bare fallow
Bare fallow ..	2cwt. superphosphate..	Wheat ..	No manure ½ cwt. super. 1 " " 2 " "	Bare fallow

We recognised the difficulties that confront an experiment of this nature, and realise that the plots may have to be continued for a number of seasons without yielding results that will assist materially in the elucidation of the problem before us. At any rate, in the interests of the farming community we entertain the hope that this may actually happen. Eventually, however, we anticipate being able to obtain some figures that will prove to be both instructive and serviceable.

(*b*) Superphosphate Plots.

1. *Direct Effect of Superphosphate Used in Bare Fallow-Wheat Rotation.*

We include under this title the second group of phosphatic fertiliser plots.

The influence of superphosphate on cereal production is recognised everywhere, but in no other part of the world has their use in agri-

culture been followed by such striking results and far-reaching effects as in Australia. To some extent, perhaps, it is the relative ineffectiveness of potassic and nitrogenous fertilisers that has thrown into relief the remarkable results obtained from the employment of water-soluble phosphatic manures.

	Tons	cwts.	lbs.
	106	0	9
	26	0	[illegible]

Nothing that can be said, however, can detract in merits of this form of phosphoric acid under ... superphosphate is the predominating manure he... cause in general it is not found to be economic ... grow crops without it, or to apply any other fertiliser either in conjunction with or in substitution for it. The extent to which it has come into use is evident by reference to the official statistics, which show that of the areas under cultivation in 1914 and 1915, the percentages dressed with superphosphates were 84.98 and 80.78 respectively. Under these circumstances it becomes a simple matter to understand why special interest always attaches to investigations into the actions of superphosphate in this country. This was one of the first subjects studied through the medium of permanent field plots at Roseworthy College, and we are now in a position to give some trustworthy average figures bearing upon certain phases of the question.

We have under trial quantitative tests with standard grade superphosphate on wheat grown on the two-course and also on the three-course rotation.

In the appended tables are shown the yields obtained under the bare fallow-wheat system from applications of 1cwt. and 2cwt. dressings of superphosphate per acre.

TABLE XI.—*Showing Effect of Different Quantities of Superphosphate 36/38 Grade—on Wheat Grown in Rotation with Bare Fallow*, 1905-15.

(*a*)—GRAIN YIELDS.

Years.	No Manure.		1cwt. Superphosphate.		2cwts. Superphosphate	
	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.
1905	21	55	28	56	30	11
1906	17	13	23	43	20	48
1907	14	36	20	31	17	53
1908	24	48	32	46	33	53
1909	24	47	29	54	29	32
1910	18	18	19	49	22	2
1911	9	0	14	7	14	38
1912	10	43	18	11	19	50
1913	2	39	5	4	7	32
1914	6	17	6	9	11	34
1915	21	35	23	32	25	49
Means	15	37	20	15	21	15

TABLE XI.—*Showing Effect of Different Quantities of Superphosphate*—continued.

(*b*)—TOTAL PRODUCE AND HAY YIELDS.

Years.	No Manure.			1cwt. Superphosphate.			2cwts. Superphosphate.		
	T.	C.	L.	T.	C.	L.	T.	C.	L.
1905	1	19	33	2	11	54	2	15	68
1906	1	18	63	2	8	100	2	6	62
1907	1	9	59	1	8	88	1	3	60
1908	1	5	1	2	11	26	2	15	84
1909	1	2	4	2	7	61	2	12	66
1910	1	17	104	2	5	98	2	8	14
1911	1	0	34	1	8	9	1	9	29
1912	0	17	63	1	6	32	1	9	64
1913	0	7	78	0	10	19	0	14	90
1914	0	10	75	0	8	106	0	16	69
1915	1	18	68	2	9	9	2	4	71
Means	1	8	2	1	16	4	1	17	102
Mean hay yield	1	14	19	2	3	106	2	6	26

The points brought out by these tables, which cover an eleven-year period, are:—

1. The increase in crop which may be expected in average years from the use of 1cwt. of superphosphate is 4bush. 38lbs. of grain or 9cwt. 87lbs. of hay per acre.

2. The corresponding increases which may be counted on in normal years when 2cwts. of the same fertiliser are applied are 5bush. 38lbs. of grain, or 12cwt. 7lbs. of hay per acre.

3. The extra yield to be anticipated in average seasons from the addition of the second cwt. of superphosphate is 1bush. of grain or 2cwt. 32lbs. of hay per acre.

In the succeeding tables the values of these increases, calculated at normal rates are shown, as also are the net values after deducting 4s. 6d. per cwt. of manure from the gross values.

TABLE XII.—*Showing Comparative Values of Differences in Yields.*

(*a*) GRAIN YIELDS.

		INCREASE OR DECREASE OVER.						
		No Manure.			1cwt. Superphosphate.			
Super-phosphate.	Mean Yields. 1905-1915.	Grain per Acre.	Value at 3/6 per Bush.	Net Value Allowing 4/6 per cwt. of Manure.	Graiff per Acre.	Value at 3/6 Bushel.	Net Value Allowing 4/6 per cwt. of Manure.
	Bush. lbs.	Bush. lbs.			Bush. lbs.		
No manure..	15 37	—	—	—	—	—	—
1cwt.	20 15	4 38	16/3	11/9	—	—	—
2cwts.....	21 15	5 38	19/9	10/9	1 0	3/6	-1/-

TABLE XII.—*Showing Comparative Values of Differences in Yields*—continued.

(*b*) TOTAL PRODUCE AND HAY YIELDS.

Superphosphate.	Mean Yields Total Produce 1905–1915.			Calculated Mean Hay Yields. 1905–1915.			No Manure. Hay Per Acre.		
	Tons.	cwts.	lbs.	Tons.	cwts.	lbs.	Tons	cwts.	lbs.
No manure	1	8	2	1	14	19		—	
1cwt.	1	16	4	2	3	106	0	9	87
2cwts.	1	17	102	2	6	26	0	12	7

INCREASE OR DECREASE OVER.

Superphosphate.	No Manure.			1cwt. Superphosphate.			
	Value at 35/- ton.		Net Value Allowing 4/6 cwt. of Super.	Hay Per Acre.		Value at 35/- ton.	Net Value Allowing 4/6 cwt. of Super.
	s.	*d.*	*s.* *d.*	T.	C. L.	*s.* *d.*	*s.* *d.*
No manure	—		—	—		—	—
1cwt.	17	1	12 7	—		—	—
2cwts.	21	1	12 1	0	2 32	4 0	-0 6

In connection with the above tables, it should be noted that the term "net value" is not used in the sense of net profit. In order to arrive at a true net profit, allowance would have to be made for the additional expense entailed in garnering and marketing the extra crop. The figures, however, enable comparisons to be made on a monetary basis, and it will be patent to all that from this point of view the practice of using 1cwt. of superphosphate for wheat crops is a truly economic one. In the matter of grain, the extra return is worth 16s. 3d., which leaves a credit balance of 11s. 9d. per acre after defraying the cost of manure. With hay crops in this district the 1cwt. dressing gives on the average an increase on the net value of 12s. 7d. per acre.

Judged on the crop returns alone, the practice of applying a second cwt. of superphosphate to wheat crops in the bare fallow-wheat rotation is an unprofitable one. Calculating on the same basis as before, we find that the system results in a debit balance of 1s. in grain crop and 6d. in hay crops.

We have, therefore, to record, as the result of 11 years' work, that on the clay loams in this district the second cwt. of superphosphate per acre applied to wheat grown in alternate years with bare fallow is not directly profit-bearing in an average season.

2. *Influence of Rainfall on Effect of Superphosphate on Wheat.*

It has been known for many years that the application of mineral manures to wheat crops help to assist them through the dry periods.

and enables them to ripen their grain under a lower rainfall than would be possible otherwise. From certain experiments conducted by Marie Davy, it has been inferred that land dressed with mineral fertilisers would produce good wheat on approximately 33 per cent. less rainfall than unmanured land. This bears out the general experience that dry seasons are more likely to bring out sharply the differences between the fertilising effects of artificial manures than wet seasons. A heavy rainfall enables the crop to make fuller use of the mineral nutrients in the soil, and thus masks the influence of readily available fertilisers.

Whereas a dry season favors the crop which is developing under the "stimulus" of a water-soluble phosphate, in wet years the ripening period is delayed, and the slower-growing crop on the unmanured plot profits by the protraction of the season in a greater degree than the fertilised crop.

Figures indicating our experience in connection with this subject are subjoined.

TABLE XIII.—*Showing Average Percentage Increases of Wheat Treated with 2cwts. of Superphosphate over Unmanured Wheat, Grown on Bare Fallow—Wheat Rotation*, 1905-1915.

	2cwts Superphosphate.		
	Grain. Per cent.		Hay. Per cent.
Seasons much above average—			
1908, 1909, 1905, 1915	+ 28·29	..	+ 33·76
Seasons normal—			
1910, 1906	+ 20·66	..	+ 23·79
Seasons below average—			
1912, 1911, 1907	+ 52·45	..	+ 43·50
Seasons very much below average—			
1913, 1914	+113·81	..	+ 71·11

It will be noticed that the number of years included under the four classes of seasons is limited, nevertheless they go to show that both in grain and hay yield the increase over the check plot yield is very much greater in the very dry years than when the rainfall was above the average.

That the vegetative period is shortened by the use of superphosphate is clearly indicated in the following table of observations on the duration of the different stages in crop development.

TABLE XIV.—*Showing Number of Days Elapsing between Characteristic Periods of Vegetation of Unmanured Wheat and of Wheat Dressed with Superphosphate. Plots 26 and 27.*

Year.	No. of Days Between Germination and Full Bloom.		No. of Days Between Full Bloom and Ripening.		No. of Days Between Germination and Ripening.	
	No Manure.	Super-phosphate.	No Manure.	Super-phosphate.	No Manure.	Super-phosphate
	No. of Days.	No. of Days.	No. of Days.	No. of Days.	No. of Days.	No. of Days
1906..	137	136	53	52	190	188
1907..	132	128	52	55	184	183
1908..	127	123	36	35	163	158
1909..	139	137	43	46	182	183
1910..	129	125	52	54	181	179
1911..	126	121	46	47	172	168
1912..	114	109	45	42	159	151
1913..	89	80	38	44	127	124
1914..	104	102	48	38	152	140
1915..	123	119	47	43	170	162
Means.	122	118	46	46	168	164

Thus we see that during the last 10 years there has been a mean difference of four days between germination and ripening in manured and unmanured crops. The whole of this difference occurs in the period between germination and flowering; the unmanured wheat ripening off quite as rapidly as the manured when once the blooming stage has been reached.

8. *Direct Effects of Superphosphate Used in the Bare Fallow, When Pasture Rotation.*

The application of superphosphate under a three-course rotation has been tested in four sets of plots, receiving ½cwt., 1cwt., 2cwts., and 3cwts. per acre respectively, when under wheat. The pasturage on these plots has varied from time to time. At the commencement of the experiment, it consisted of spontaneous herbage, but of late years rape has been regularly sown without manure at the rate of 4lbs. of seed per acre.

The high prices that stock are bringing and are likely to command for some time to come will incline farmers towards this rotation, which admits of more stock being carried than is possible under the two-course system. For this reason the appended results showing mean yields of grain and hay are of peculiar interest at the present juncture.

TABLE XV.—*Showing Effects of Different Quantities of Superphosphate—36/38 Grade—on Wheat Grown in Rotation with Pasture and Bare Fallow*, 1905-1915.

(*a*) GRAIN YIELDS.

Years.	Superphosphate.							
	½cwt.		1cwt.		2cwts.		3cwts.	
	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.
1905	28	53	29	19	30	51	28	52
1906	19	14	17	46	20	4	22	57
1907	16	24	14	22	13	21	12	5
1908	27	32	29	1	31	25	32	53
1909	25	48	26	37	27	33	29	38
1910	18	42	19	2	20	18	17	39
1911	17	24	17	51	21	47	22	43
1912	18	58	20	54	22	10	19	52
1913	7	11	6	8	5	29	5	43
1914	6	41	8	20	11	11	10	8
1915	23	5	23	3	24	55	25	16
Means	19	5	19	18	20	49	20	42

(*b*) TOTAL PRODUCE AND HAY YIELDS.

Years.	Superphosphate								
	½cwt.			1cwt.			2cwts.			3cwts.		
	T.	C.	L.	T.	C.	L.	T.	C.	L.	T.	C.	L.
1905	2	14	88	2	17	4	2	15	22	2	18	104
1906	2	6	3	1	17	46	2	2	7	2	4	18
1907	1	3	21	1	0	27	0	19	77	0	18	12
1908	2	7	50	2	11	55	2	12	71	2	14	74
1909	2	8	46	2	10	56	2	11	70	2	19	74
1910	2	7	24	2	10	71	2	10	80	2	2	15
1911	1	17	3	1	17	69	2	1	73	2	0	90
1912	1	9	68	1	11	93	1	13	5	1	10	102
1913	0	13	39	0	11	48	0	11	24	0	7	12
1914	0	7	55	0	11	37	0	15	110	0	12	89
1915	2	4	85	2	3	18	2	5	44	2	6	96
Means	1	16	34	1	16	68	1	18	12	1	17	93
Mean hay yields	2	4	31	2	4	72	2	6	53	2	6	15

A glance at the above tables will show that there has been on the average of seasons a steady increase in yield up to the 2cwt. plot, whereas the mean returns show a slight decline as the result of the addition of the third cwt. of manure. This remark applies to grain and hay alike.

The plots may be conveniently compared one with another by reference to the next two tables, which indicate differences in yields, together with the gross and net values of the same.

TABLE XVI.—*Showing Comparative Values of Differences in Yields.*

(*a*) GRAIN YIELDS.

Superphosphate.	Mean Yields, 1905-1915	INCREASE OVER OR DECREASE BELOW. ½cwt. Grain per Acre.	½cwt. Value at 3s. 6d. per Bush.	½cwt. Net Value, Allowing 4s. 6d. per Cwt. Super.	1cwt. Grain per Acre.	1cwt. Value at 3s. 6d. per Bush.	1cwt. Net Value, Allowing 4s. 6d. per Cwt. Super.
	Bush. lbs.	Bush. lbs.	*s. d.*	*s. d.*	Bush. lbs.	*s. d.*	*s. d.*
½cwt.	19 5	—	—	—	—	—	—
1cwt.	19 18	0 13	0 9	— 1 6	—	—	—
2cwts.	20 49	1 44	6 1	— 0 8	1 31	5 4	0 10
3cwts.	20 42	1 37	5 8	— 5 7	1 24	4 11	— 4 1

Superphosphate.	Mean Yields, 1905-1915.	2cwts. Grain per Acre.	2cwts. Value at 3s. 6d. per Bush.	2cwts. Net Value, Allowing 4s. 6d. per Cwt. Super.
	Bush. lbs.	Bush. lbs.	*s. d.*	*s. d.*
½cwt.	19 5	—	—	—
1cwt.	19 18	—	—	—
2cwts.	20 49	—	—	—
3cwts.	20 42	— 0 7	— 0 5	— 4 11

(*b*) HAY YIELDS.

Superphosphate.	Mean Yields, Total Produce, 1905-15.	Calculated Mean Hay Yields, 1905-15.	Hay per Acre	½cwt. Value at 35s. per Ton.	½cwt. Net Value, Allowing 4s. 6d. Cwt Super.	1cwt. Hay per Acre.	1cwt. Value at 35s. per Ton.	1cwt. Net Value, Allowing 4s. 6d. Cwt. Super.
	T. C. L.	T. C. L.	C. L.	*s. d.*	*s. d.*	C. L.	*s. d.*	*s. d.*
½cwt.	1 16 34	2 4 31	—	—	—	—	—	—
1cwt.	1 16 68	2 4 72	0 41	0 8	— 1 7	—	—	—
2cwts.	1 18 12	2 6 53	2 22	3 10	— 2 11	1 93	3 2	— 1 4
3cwts.	1 17 93	2 6 15	1 96	3 3	— 8 0	1 55	2 7	— 6 5

Superphosphate.	Mean Yields, Total Produce, 1905-15.	Calculated Mean Hay Yields, 1905-15.	2cwts. Hay per Acre.	2cwts. Value at 35s. per Ton.	2cwts. Net Value, Allowing 4s. 6d. Cwt. Super.
	T. C. L.	T. C. L.	C. L.	*s. d.*	*s. d.*
½cwt	1 16 34	2 4 31	—	—	—
1cwt.	1 16 68	2 4 72	—	—	—
2cwts.	1 18 12	2 6 53	—	—	—
3cwts.	1 17 93	2 6 15	— 0 38	— 0 7	— 5 1

The first point that calls for notice is the relatively small increase in hay as well as in grain from the application of the second ½cwt. of manure. The extra yield is so slight that the heavier manuring is seen to involve a net loss of 1s. 6d. per acre. The 2cwt. dressing has given the most satisfactory returns in grain, but in the matter of hay it

does not appear to advantage when compared with either of the lighter dressed plots. Thus it has resulted in a net loss of 2s. 11d. per acre as compared with the ½cwt. plot, and 1s. 4d. per acre compared with the 1cwt. dressing.

In not one instance has the use of a third cwt. of superphosphate [illegible] bearing—in fact, the net loss entailed has varied from 4s. 1d. to 5s. 7d. in grain crops, and 5s. 1d. to 8s. per acre in hay crops. These figures are not calculated to inspire confidence in the policy of heavy manuring, but in a three-course system the manure returns part of its value in the form of grazing, and consequently it is not correct to gauge the value of the fertilising effects of superphosphate solely by the increased crop returns.

A similarly designed experiment was started in Grainger's C in 1910 on land that had not been previously manured. The opportunity was seized of including a check plot receiving no manure at all. The grain and hay yields derived from these plots are given below.

TABLE XVII.—*Showing Effects of Different Quantities of Superphosphate 36/38 Grade—on Wheat Grown in Rotation with Pasture and Bare Fallow on Land not Previously Dressed with Manure*, 1910-15.

(*a*) GRAIN YIELDS.

Years.	No Manure.	½cwt. Super.	1cwt. Super.	2cwts. Super.	3cwts. Super.
	Bush. lbs.	Bush. lbs.	Bush. lbs.	Bush. lbs.	Bush. lb
1910	15 25	21 43	22 44	22 15	22 13
1911	—	—	—	—	—
1912	5 38	13 11	17 23	16 43	19 18
1913	2 26	4 49	5 47	6 14	5 26
1914	7 18	15 30	11 43	11 50	9 36
1915	—	—	—	—	—
Means	7 42	13 48	14 24	14 15	14 8

(*b*) TOTAL PRODUCE AND HAY YIELDS.

Years.	No Manure.			½cwt.			1cwt.			2cwts.			3cwts.		
	T.	C.	L.	T.	C.	L.	T.	C.	L.	T.	C.	L.	T.	C.	L.
1910	1	7	47	1	13	13	1	18	38	2	0	61	2	0	64
1911	1	2	77	1	7	49	1	12	50	1	13	49	1	14	71
1912	0	12	28	1	3	13	1	10	63	1	8	109	1	12	58
1913	0	5	78	0	8	97	0	11	98	0	12	82	0	14	45
1914	0	9	74	1	1	98	0	16	98	1	0	51	0	15	22
1915	0	14	98	1	5	23	1	16	39	1	12	27	1	12	31
Means	0	15	48	1	3	30	1	7	83	1	8	7	1	8	30
Mean hay yield	0	18	91	1	8	42	1	13	93	1	14	25	1	14	53

The inclusion of an unmanured plot in this series enables us to measure the wonderful effect of the first ½cwt. of manure and at the same time to contrast this result with the comparatively small increments due to additional quantities. For instance, we note an increase of 6bush. 6lbs. of grain and 9cwt. 63lbs. of hay per acre from a ½cwt.

dressing whilst the maximum increase in grain yield attributable to further additions is 36lbs. per acre from the 1cwt. plot. In the mean hay returns it will be observed that the second ½cwt. has again given the largest increase over and above that obtained from the ½cwt. dressing. In this instance, an increase of 5cwt. 51lbs. per acre is recorded, whereas the 2cwt. and 3cwt. applications have returned relatively small corresponding increases, namely, 44lbs. and 28lbs. of hay per acre respectively.

We will now consider these differences in terms of monetary value.

TABLE XVIII.—*Showing Comparative Values of Differences in Yields.*

(*a*) GRAIN YIELD.

INCREASE OVER OR DECREASE BELOW.

Superphosphate.	Mean Yield per Acre.	No Manure. Yield per Acre.	No Manure. Value at 3/6 per Bush.	No Manure. Net Value Allowing 4/6 per cwt. Super.	½cwt. Yield per Acre.	½cwt. Value at 3/6 per Bush.	½cwt. Net Value Allowing 4/6 per cwt. Super.
	Bush. lbs.	Bush. lbs.	s. d.	s. d.	Bush. lbs.	s. d.	s. d.
No manure	7 42	—	—	—	—	—	—
½cwt.	13 48	6 6	21/4	19/1	—	—	—
1cwt.	14 24	6 42	23/5	18/11	0 36	2/1	–/2
2cwts.	14 15	6 33	22/11	13/11	0 27	1/7	–5/2
3cwts.	14 8	6 26	22/6	9/–	0 20	1/2	–10/1

INCREASE OVER OR DECREASE BELOW.

Superphosphate.	Mean Yield per Acre.	1cwt. Yield per Acre.	1cwt. Value at 3/6 per Bushel.	1cwt. Net Value Allowing 4/6 per cwt. Super.	2cwts. Yield per Acre.	2cwts. Value at 3/6 per Bushel.	2cwts. Net Value Allowing 4/6 per cwt. Super.
	Bush. lbs.	Bush. lbs.	s. d.	s. d.	Bush. lbs.	s. d.	s. d.
No manure	7 42	—	—	—	—	—	—
½cwt.	13 48	—	—	—	—	—	—
1cwt.	14 24	—	—	—	—	—	—
2cwts.	14 15	–0 9	–/6	–5/–	—	—	—
3cwts.	14 8	–0 16	–/11	–9/11	–/7	–/5	–4/11

(*b*) HAY YIELDS.

INCREASE OVER OR DECREASE BELOW.

Superphosphate.	Mean Yield Total Produce. 1910-15.	Calculated Mean Hay Yields. 1910-15.	No Manure. Hay Per Acre.	No Manure. Value at 35/- Per Ton.	No Manure. Net Profit Allowing 4/6 Per Cwt. Super.	½cwt. Hay Per Acre.	½cwt. Value at 35/- Per Ton.	½cwt. Net Profit Allowing 4/6 Per Cwt. Super.
	T. C. L.	T. C. L.	T. C. L.	s. d.	s. d.	T. C. L.	s. d.	s. d.
No manure	0 15 48	0 18 91	—	—	—	—	—	—
½cwt.	1 3 30	1 8 42	0 9 63	16 9	14 6	—	—	—
1cwt.	1 7 83	1 13 93	0 15 2	26 3	21 9	0 5 51	9 7	4 6
2cwts.	1 8 7	1 14 25	0 15 46	27 0	18 0	0 5 95	10 3	3 6
3cwts.	1 8 30	1 14 53	0 15 74	27 5	13 11	0 6 11	10 8	–0 1

TABLE XVIII.—*Showing Comparative Values of Differences in Yields.*—continued.

(*b*) HAY YIELDS—*continued.*

Superphosphate.	Mean Yield Total Produce, 1910-15.	Calculated Mean Hay Yields, 1910-15.	INCREASE OVER OR DECREASE BELOW. 1cwt. Hay Per Acre.	Value at 35/- Per Ton.	Net Profit Allowing 4/6 Per Cwt. Super.	2cwts. Hay Per Acre.	Value at 35/- Per Ton.	Net Profit Allowing 4/6 Per Cwt. Super.
	T. C. L.	T. C. L.	T. C. L.	s. d.	s. d.	T. C. L.	s. d.	s. d.
No manure.	0 15 48	0 18 91	—	—	—	—	—	—
½cwt.	1 3 30	1 8 42	—	—	—	—	—	—
1cwt.	1 7 83	1 13 93	—	—	—	—	—	—
2cwts.	1 8 7	1 14 25	0 0 44	8	−3 10	—	—	—
3cwts.	1 8 30	1 14 53	0 0 72	1 1	−7 11	0 0 28	0 5	−4 1

The computations in the above tables have been made on the same market values as in the foregoing calculations of a similar character.

Regarding the yield of grain, it should be pointed out that the mean figures represent the average return over four seasons, a period altogether too brief for an investigation of this character. It will be recalled that in the corresponding plot in Field No. 4 the best grain yield was secured from 2cwt. of superphosphate. In this instance, however, the use of a similar quantity of fertiliser is seen to result in a "net loss" of 5s. 2d per acre as compared with the application of ½cwt.

Up to the present time, the ½cwt. plot has proved the most profitable, but the difference between the net profit from it and that from the 1cwt. plot is virtually negligible, and is quite conceivable in the light of our experience in No. 4 that in the course of time the use of 1cwt. or more of superphosphate per acre will prove to be more profitable even with regard to crop production than the lighter quantity. The use of 3cwt. of superphosphate for wheat crops is contra indicated here to an even greater degree than it was on Table XVI.

Turning to the hay values, it will be noticed that the highest net profit has been derived from the 1cwt. plot, which shows an additional net profit of 7s. 4d. per acre over the ½cwt. plot, and is 3s. 10d. per acre better than the 2cwt. plot. The hay yields shown are the means of six seasons, and the results conform closely to preconceived ideas.

Reviewing these results from Fields No. 4 and Grainger's C broadly, we are impelled to the conclusion that from the point of view of crop production the most satisfactory manurial dressing for wheat or wheaten hay crops on a three-course system in this district is in the region of 1cwt. per acre of superphosphate. This statement is made without reference to the secondary effects of the manure on the quality and amount of pasturage produced during the 18 months the land is available for grazing.

4. *The Grazing Value of Land Worked Under Bare Fallow, Wheat, Pasture Rotation and Manured with Different Quantities of Superphosphate.*

It has always been contended by the advocates of heavy manuring that the residual effects of the excess quantity would more than repay the extra cost by its influence on the nutritive value and stock-carrying capacity of the natural herbage or forage crops sown on the stubbles. This was regarded as a complete rejoinder to those who stood for the application of superphosphate in quantities no more than adequate for the production of full crops of hay or grain. The gradual increase in importance of farm livestock has emphasised the need for thoroughly investigating this question in field plots, and with this purpose in view our predecessors had the No. 4 and Grainger's C three-course plots fenced off, so that the relative grazing values might be carefully compared.

The No. 4 plots were partially fenced off in 1906, but as complete results were not available till 1909, the grazing records for the intervening period have been excluded from the appended tables.

TABLE XIX.—*Showing Influence of Heavy and Light Dressings of Superphosphate on Sheep-carrying Capacity of Land.*

Year.	Stubble Grazing. Jan.-March.	Grazing Year. April-March.	Grazing before Fallowing April-June.	Total Grazing.	Sheep per Acre over whole Area under Rotation Sheep per Acre per Annum.
	EQUIVALENT NUMBER OF SHEEP PER ACRE PER ANNUM.				
	½*cwt. Plots.*				
1909	0·25	1·92	0·37	2·54	0·85
1910	0·15	1·19	1·22	2·56	0·85
1911	0·57	0·97	0·56	2·10	0·70
1912	0·56	1·50	0·00	2·06	0·69
1913	0·20	0·68	0·00	0·88	0·29
1914	0·62	0·62	0·13	1·37	0·46
1915	1·83	3·39	0·50	5·72	1·91
Means 1909-15	0·60	1·47	0·40	2·46	0·82

Value of grazing at 15s. per sheep per annum—£1 16s. 11d.

	1*cwt. Plots.*				
1909	0·21	1·99	0·51	2·71	0·90
1910	0·14	1·20	1·22	2·56	0·85
1911	0·66	1·11	0·57	2·34	0·78
1912	0·76	1·68	0·00	2·44	0·81
1913	0·23	0·60	0·00	0·83	0·28
1914	0·38	0·53	0·25	1·16	0·39
1915	2·29	4·64	0·90	7·83	2·61
Means 1909-15	0·67	1·68	0·49	2·84	0·95

Value of grazing at 15s. per sheep per annum—£2 2s. 7s.

TABLE XIX.—*Showing Influence of Heavy and Light Dressings*—contd.

Year.	Stubble Grazing Jan.-March.	Grazing Year. April-March.	Grazing before Fallowing. April-June.	Total Grazing.	Sheep per Acre over whole Area under Rotation. Sheep per Acre per Annum.
	EQUIVALENT NUMBER OF SHEEP PER ACRE PER ANNUM.				
			2cwt. Plots.		
1909	0·27	2·38	0·61	3·26	1·09
1910	0·13	1·19	1·21	2·53	0·84
1911	0·75	1·12	0·66	2·53	0·84
1912	0·68	1·87	0·00	2·55	0·85
1913	0·20	0·69	0·00	0·89	0·30
1914	0·55	1·05	0·28	1·88	0·63
1915	2·39	4·42	1·55	8·36	2·79
Means 1909-15	0·71	1·82	0·62	3·14	1·05
Value of grazing at 15s. per sheep per annum—£2 7s. 1d.					
			3cwt. Plots.		
1909	0·27	2·49	0·63	3·39	1·13
1910	0·14	1·32	1·23	2·69	0·90
1911	0·82	1·38	0·68	2·88	0·96
1912	0·89	1·87	0·00	2·76	0·92
1913	0·20	0·79	0·00	0·99	0·33
1914	0·45	0·79	0·19	1·43	0·48
1915	2·48	4·49	1·37	8·34	2·78
Means 1909-15	0·75	1·88	0·59	3·21	1·07
Value of grazing at 15s. per sheep per annum—£2 8s. 2d.					

The total grazing figures given above represent the sum of the average number of sheep carried per acre per annum on the wheat stubble, on the rape crop, and on the rape stubble immediately prior to fallowing. This covers a period of approximately 18 months, that is to say that under the scheme of rotation there is available in any one year the equivalent of a year and a half's grazing on a single plot. The figures given under total grazing will, therefore, indicate the total number of sheep carried on a per acre per annum basis over the grazed area of each series of three plots, and consequently the sheep-carrying capacity of the whole area of the series will be represented by one-third of the "total grazing," as shown in the final columns of the above tables.

This implies that the grazing capacity of a farm worked under the above rotation, when expressed on terms of the whole acreage, is 0.82, 0.95, 1.05, and 1.07 sheep per acre per annum, according as the wheat crop is manured with ½cwt., 1cwt., 2cwts., or 3cwts. of superphosphate per acre.

The results now submitted cover a period of seven years, and it is noteworthy that the grazing capacity gradually rises as the manurial dressing is increased. The year 1914 had a depressing effect on the average figures, but this was more than counterbalanced by the luxuriant grazing provided in 1915. The rape crop in 1915 carried the equivalent of 3.39 sheep per acre per annum on the ½cwt. group,

and 4.64 on the 1cwt. series. The "total grazing" figures for last year were even more remarkable, ranging from 5.72 on the ½cwt. to 8.36 sheep per acre per annum on the 2cwt. plot.

The mean "total grazing" figures will form the basis of comparison in a subsequent table, and it will suffice for the present to draw attention to the money equivalents shown above for each series of plots.

The corresponding plots in Grainger's C date back to 1911, hence the grazing returns now submitted cover a period of five (5) years.

TABLE XX.—*Showing Influence of Heavy and Light Dressings of Superphosphate on Sheep-carrying Capacity of Land.*

GRAINGER'S MANURE PLOTS.

No Manure.

Year.	Stubble Grazing.	Fodder Crop.	Autumn Pasture.	Total Grazing.	Sheep Per Acre Per Annum.
1911	0·54	0·46	0·00	1·00	0·33
1912	0·27	0·50	0·00	0·77	0·26
1913	0·37	0·21	0·00	0·58	0·19
1914	0·37	0·28	0·00	0·65	0·22
1915	1·22	2·16	0·42	3·80	1·27
Means 1911-15	0·55	0·72	0·08	1·36	0·45

Value of grazing at 15s. per acre per annum—£1 0s. 5d.

½cwt.

1911	0·68	0·56	0·00	1·24	0·41
1912	0·41	0·71	0·00	1·12	0·37
1913	0·43	0·29	0·00	0·72	0·24
1914	0·81	0·36	0·00	1·17	0·39
1915	1·40	3·28	0·66	5·34	1·78
Means 1911-15	0·75	1·04	0·13	1·92	0·64

Value of grazing at 15s. per acre per annum—£1 8s. 10d.

1cwt.

1911	0·82	0·67	0·00	1·49	0·50
1912	0·54	0·92	0·00	1·46	0·49
1913	0·46	0·40	0·00	0·86	0·29
1914	0·68	0·45	0·00	1·13	0·38
1915	1·37	4·09	0·82	6·28	2·09
Means 1911-15	0·77	1·31	0·16	2·24	0·75

Value of grazing at 15s. per acre per annum—£1 13s. 7d.

2cwts.

1911	0·96	0·86	0·00	1·82	0·61
1912	0·68	1·12	0·00	1·80	0·61
1913	0·50	0·50	0·00	1·00	0·33
1914	0·75	0·45	0·00	1·20	0·40
1915	1·92	4·49	1·00	7·41	2·47
Means 1911-15	0·96	1·48	0·20	2·65	0·88

Value of grazing at 15s. per acre per annum—£1 19s. 9d.

3cwts.

1911	1·07	0·79	0·00	1·86	0·62
1912	0·64	1·62	0·00	2·26	0·75
1913	0·59	0·67	0·00	1·26	0·42
1914	0·43	0·69	0·00	1·12	0·37
1915	1·82	2·59	1·11	5·52	1·84
Means 1911-15	0·91	1·27	0·22	2·40	0·80

Value of grazing at 15s. per acre per annum—£1 16s.

The main difference between these results and those previously discussed is the slight falling away in grazing value of the 3cwt. plot, which has carried on an average over the five seasons a quarter of a sheep per acre per annum less than the 2cwt. plot. The discrepancy is not large, and may disappear later on as the manurial residues accumulate. It would not be inconsistent with our general experience to find that the 2cwt. and 3cwt. plots remained approximately equal in respect of total grazing for a number of years, as these plots occupy land that has not previously received superphosphate, and it may take a number of years, even 10 or 12, before marked differences in favor of the heavier dressing become apparent. One other point brought out by these plots is the increase of over half a sheep per acre in the annual grazing value of the ½cwt. plot in comparison with the unmanured.

5. *The Direct and Indirect Values of Different Quantities of Superphosphate Applied to Wheat Grown in a Bare Fallow, Wheat, Pasture Rotation.*

We are now in a position to combine the cropping and grazing results of these different dressings of superphosphate in a tabular statement, and to compare the money values of the effects they have produced. In the appended table, the relative total values are shown for both the No. 4 and Grainger's C Plots.

TABLE XXI.—*Showing Combined Cropping and Grazing Returns from Both Series of Bare Fallow, Wheat, Pasture Rotations.*

Field No. 4.

Average Grain Yield.	Value at 3s. 6d. per Bushel.	Average Grazing Capacity.	Value at 15s. per Sheep.	Total Cropping and Grazing Values.	Net Combined Values.	Net Profit or Loss after Deducting 4s. 6d. per cwt. for Extra Manure Used.			
						No Manure.	½cwt.	1cwt.	2cwts.
Bsh. lbs.	£ s. d.	Acres.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	s. d.	s. d.	s. d.
.... 19 2	3 6 7	2·46	1 16 11	5 3 6	5 1 3	—	—	—	—
.... 19 18	3 7 7	2·84	2 2 7	5 10 2	5 5 8	—	+ 4 5	—	—
.... 20 49	3 12 10	3·14	2 7 1	5 19 11	5 10 11	—	+ 9 8	+ 5 3	—
.... 20 42	3 12 5	3·21	2 8 2	6 0 7	5 7 1	—	+ 5 10	+ 1 5	– 3 10

Grainger's Plots.

ture	7	42	1	6	11	1·36	1	0	5	2	7	4	2	7	4	—	—	—	—
....	13	48	2	8	4	1·92	1	8	10	3	17	2	3	14	11	+ 1	7	7	—	—	—
....	14	24	2	10	5	2·24	1	13	7	4	4	0	3	19	6	+ 1	12	2	+ 4	7	—	—
....	14	15	2	9	10	2·65	1	19	9	4	9	7	4	0	7	+ 1	13	3	+ 5	8	+ 1	1	—
....	14	8	2	9	6	2·40	1	16	0	4	5	6	3	12	0	+ 1	4	8	– 2	11	– 7	6	– 8	7

It will be remembered that the maximum amount of superphosphate that can be profitably applied to wheat grown on the bare fallow-wheat rotation was found to be at least 1cwt. and less than 2cwt. per acre. In this case the question of grazing returns did not arise. Similarly, when the value of crop alone was considered on the three-course system, it was found that the limit lay somewhere between 1cwt. and 2cwt., and probably approached closer to the lesser than the greater quantity. When full credit is given to residual effects of the manure, however, we observe that the heavier dressing is amply justified.

In both series of plots, the application of 2cwt. of superphosphate is seen in the above Table of Combined Values to surpass all others in net returns. In the No. 4 experiments it has yielded 9s. 8d. per acre more than the ½cwt., 5s. 3d. more than the 1cwt., and 3s. 10d. in advance of the 3cwt. Similarly, in Grainger's C, the differences in favor of the 2cwt. are £1 13s. 3d., 5s. 8d., 1s. 1d., and 8s. 7d. per acre in respect of the unmanured, ½cwt., 1cwt., and 3cwt. dressings. In this second series, the advantage over the 1cwt. of superphosphate is relatively small, amounting to only 1s. 1d. per acre, whereas in the first group it is nearly five times as great. The explanation of this is that the older plots are profiting by the heavy dressings applied in years gone by, before the land was brought under permanent experiments, whereas in the case of the newer plots, the land had not been manured prior to 1910, and consequently there is no reserve of phosphoric acid to obscure the effects of the different quantities of manure since applied. Reference to the column giving the combined gross returns will bear this out, as it will be noticed that there is a gradual rise from the ½cwt. to the 3cwt. in Field No. 4, whereas in Grainger's C the 3cwt. plot has returned 4s. 1d. less than the 2cwt., and this on account of the fact that sufficient phosphoric acid has not yet accumulated to bring the land into a condition of fertility that experience has shown to be necessary before heavy dressings of superphosphate are able to exert their full influence.

The ultimate result of these inquiries into the effects of different amounts of superphosphate on wheat crops in this district is to fortify us in our general farm practice of applying up to 2cwt. per acre. This is regarded by many as unnecessarily lavish, and possibly the thought is entertained that on economic grounds it could not be justified. It is clear, however, from the above findings, that not only does the 2cwt. pay for itself, but, in addition, it returns annually about half a crown per acre more than any other amount that has been subjected to experimental investigation.

(c) Basic Slag or Thomas Phosphate.

This is not a water-soluble form of phosphatic fertiliser, but the phosphate it contains is intermediate in solubility between that present in superphosphate and the phosphate of lime present in bonedust. It belongs to the citrate soluble group of phosphatic manures, which is characterised by the fact that the phosphate in them will dissolve out to a large extent when they are brought into contact with weak acids, such as 1 per cent. solution of citric acid. Manures of this type are largely employed in Europe, in districts of heavy rainfall, for top-dressing pastures, and for this purpose they are admirably suited, as they contain, in addition to phosphoric acid, a large amount of lime. In this district, however, the soils are not notably deficient in lime, and since the chief desideratum here is a readily soluble form of phosphoric acid to act as a stimulant to the young wheat crop, it would be contrary to expectations to find basic slag equal in value to corresponding amounts of water soluble phosphatic manures in this district. For the past 10 years there have been conducted at the College field trials with 2cwt. and 3cwt. dressings of basic slag on wheat grown alternately with bare fallow, and we submit below the results of each year's crop, together with the mean returns, and also, for the sake of instituting comparisons, the yields obtained from adjacent plots receiving no manure and 2cwts. of superphosphate per acre.

Table XXII.—*Showing Results of Dressings with Basic Slag*, 1906-15.

Years.	No Manure.	2cwts. Super-phosphate.	2cwts. Basic Slag.	3cwts. Basic Slag.
	(a) Grain.			
	Bush. lbs.	Bush. lbs.	Bush. lbs.	Bush. lbs.
1906	15 57	20 49	18 21	19 39
1907	13 21	14 58	14 8	13 58
1908	24 33	38 20	26 44	32 13
1909	26 2	31 2	30 59	33 20
1910	18 29	19 11	25 7	19 58
1911	5 39	17 32	12 35	16 53
1912	9 25	19 5	14 54	16 43
1913	2 41	8 35	4 24	5 34
1914	8 39	16 47	10 19	12 30
1915	19 51	22 56	22 40	26 34
Means	14 28	20 55	18 1	19 44

TABLE XXII.—*Showing Results of Dressings with Basic Slag*, 1906-15.—continued.

Years.	No Manure.			2cwts. Super-phosphate.			2cwts. Basic Slag.			3cwts. Basic Slag		
	(*b*) TOTAL PRODUCE.											
	T.	C.	L.	T.	C.	L.	T.	C.	L.	T.	C.	L.
1906	2	0	91	2	11	60	2	3	44	2	2	52
1907	0	18	17	0	19	13	0	17	106	0	17	82
1908	2	0	96	3	1	111	2	4	45	1	15	45
1909	2	6	97	2	15	66	2	14	100	2	19	76
1910	1	18	9	2	3	76	2	8	9	2	3	100
1911	0	13	20	1	13	12	1	5	42	1	15	71
1912	0	17	83	1	8	45	1	6	28	1	7	34
1913	0	9	44	0	16	85	0	14	52	0	14	99
1914	0	14	46	1	4	76	0	19	45	0	15	99
1915	1	16	30	2	2	12	1	19	19	2	5	63
Means	1	7	64	1	17	78	1	13	38	1	13	94

A glance at the above data will disclose the ineffectiveness for hay or grain crops of basic slag, as compared with superphosphate, even when a third cwt. of the former is set against a 2cwt. plot of the latter. The influence of the slag, however, is seen by comparing the yields with those from the unmanured plots, when differences of 3bush. 33lbs. with 2cwt., and 5bush. 16lbs. with 3cwt., will be noted in favor of the manure. When we contrast slag with superphosphate, we are at once struck with the unevenness of the results. On one occasion—1910—the 2cwt. plot of citrate soluble phosphate has given slightly better returns in hay as well as grain than the superphosphate, and the 3cwt. plot of slag exceeded the 2cwt. superphosphate on three occasions in respect of grain and four times in regard to hay.

On inspection of the rainfall tables, it will be discovered that with one exception these heavy yields have coincided with years of unusually high rainfall. Looking further into this matter, we found that if we take the mean grain yields for the three years of heaviest "useful" rain, and compare them with the corresponding returns for the three years of normal "useful" rain, the dependence of slag on rainfall in this district is clearly demonstrated. For example, in the wet years the 2cwt. plot averaged 1bush. 52lbs. and the 3cwt. plot 2bush. 14lbs. more grain per acre than the 2cwt. of superphosphate, whilst in the normal seasons the slag yielded an average of 5bush. 33lbs. from the 2cwt. and 3bush. 10lbs. from the 3cwt. dressings less than the 2cwt. superphosphate. It is in abnormally wet seasons, then, that slag shows to advantage; but it is on the mean results that we have to focus our attention, in order to gauge the value of the manure. With this end in view, we have set out in the following statement the gross and net values of the mean returns gained during the past decade.

TABLE XXIII.—*Showing Comparative Values of Differences in Yield.*

(*a*) GRAIN YIELDS.

Manure.	Mean Yields, 1906-1915.	INCREASE OVER OR DECREASE BELOW. No Manure.			2cwts. Superphosphate.			2cwts. Basic Slag.		
		Difference per Acre.	Value at 3s. 6d. per Bush.	Net Value.	Difference per Acre.	Value at 3s. 6d. per Bush.	Net Value.	Difference per Acre.	Value at 3s. 6d. per Bush.	Net Value.
	Bush. lbs.	Bush. lbs.	*s. d.*	*s. d.*	Bush. lbs.	*s. d.*	*s. d.*	Bush. lbs.	*s. d.*	*s. d.*
No manure	14 28	—	—	—	—	—	—	—	—	—
2cwts. superphosphate	20 55	6 27	22 7	13 7	—	—	—	—	—	—
2cwts. basic slag	18 1	3 33	12 5	3 5	−2 54	−10 2	−10 2	—	—	—
3cwts. basic slag	19 44	5 16	18 5	4 11	−1 11	−4 2	−8 8	1 43	6 0	1 6

(*b*)—HAY YIELDS.

Manure.	Mean Yields.		INCREASE OVER OR DECREASE BELOW. No Manure.			2cwts. Superphosphate.			2cwts. Basic Slag.		
	Total Produce.	Hay Equivalent.	Difference Hay Yield per Acre.	Value at 35s. per ton.	Net Value.	Difference Hay Yield per Acre.	Value at 35s. per ton.	Net Value.	Difference Hay Yield per Acre.	Value at 35s. per ton.	Net Value.
	T. C. L.	T. C. L.	T. C. L.	*s. d.*	*s. d.*	T. C. L.	*s. d.*	*s. d.*	T. C. L.	*s. d.*	*s. d.*
No manure	1 7 64	1 13 70	—	—	—	—	—	—	—	—	—
2cwts. superphosphate	1 17 78	2 5 109	0 12 39	21 7	12 7	—	—	—	—	—	—
2cwts. basic slag	1 13 38	2 0 74	0 7 4	12 4	3 4	−0 5 35	−9 4	−9 4	—	—	—
3cwts. basic slag	1 13 94	2 1 30	0 7 72	13 4	−0 2	−0 4 79	−8 3	−12 9	0 0 68	1 1	−3 5

These figures cannot be held to favor the adoption of basic slag in this locality. The 2cwt. plot shows a net loss of 10s. 2d. per acre over that receiving 2cwt. of superphosphate, and the addition of another cwt. of slag has only resulted in reducing the deficit by 1s. 6d. per acre. In the case of hay crops, the net losses are 9s. 4d. and 12s. 9d. respectively, and hence we are bound to conclude that there is no good reason for advocating the use of basic slag as a wheat manure under Roseworthy conditions.

(To be continued.)

CAPONISING.

The Poultry Expert (Mr. D. F. Laurie), in reply to a correspondent inquiring for information on the subject of caponising cockerels, said—For commercial purposes, *i.e.*, for the profitable production of table poultry for the local and for the oversea export market, it was not necessary to caponise the cockerels. In fact there was no money to be made as a result of the operation. Cockerels should be yarded separately and well fed, fattened off and sold as soon as fat, say at from 14 to 16 weeks old. To keep them longer was unprofitable, and the buyers neglect the old "staggy" specimens, and they would not suit the export trade.

Caponising should be performed on light breed cockerels at about 10 to 12 weeks old, and on heavy breeds a little later. Instruments could be purchased through a storekeeper, who would obtain them from one of the wholesale chemists. Instructions, as a rule, were on a printed slip with the outfit, and were for the particular type of instruments.

In any case it would be necessary to experiment on a dead bird. No great benefit from the operation was obtainable until the birds were 10 to 12 months old, and by that time they had cost at least 10s. each for food. To make a profit one would require from 8s. to 10s. each, and no buyers were likely to pay such prices. In older and richer countries there was but a limited market for capons.

SEASON 1916-17.

ESTIMATED AREA UNDER CROP.

More than ordinary interest is centred round the area sown to wheat, oats, and barley in South Australia this year (1916-17). The prevailing impression was that the area under wheat was less than that of the preceding year, and, according to the preliminary estimate prepared by the Government Statist (Mr. W. L. Johnston), that has proved to be the case. In 1915-16 3,220,645 acres were sown to wheat, and in 1916-17 3,031,889, which means a decrease of 188,756 acres—equal to 5·86 per cent. of the total. Barley is much more in evidence this year than was the case last year, the figures being—1915-16, 92,678 acres, and 1916-17, 116,391 acres; a total increase of 23,713 acres, or 25·59 per cent. The area under oats has declined to the extent of 4,985 acres, from 320,901 acres in 1915-16 to 315,916 acres in 1916-17—representing a percentage of 1·55. The total area under wheat, barley, and oats this year is 170,028 acres less than the total for last year.

Tabulated, the figures are as follows:—

Preliminary Estimate of Area sown with Wheat, Barley, and Oats, Season 1916-17, in comparison with Season 1915-16.

	Wheat.			
	1915-16.	1916-17.	Increase or Decrease.	
			Acres.	Per cent.
	Acres.	Acres.		
I. Central	1,036,518	998,235	— 38,283	— 3·69
II. Lower North	960,387	854,854	— 105,533	— 10·99
III. Upper North	335,387	336,964	1,577	·47
IV. South-Eastern	378,472	362,265	— 16,207	— 4·28
V. Western	509,544	479,183	— 30,361	— 5·96
Outside of Counties	337	388	51	15·13
Total State	3,220,645	3,031,889	— 188,756	— 5·86

	Barley.			
	1915-16.	1916-17.	Increase or Decrease.	
			Acres.	Per cent.
	Acres.	Acres.		
I. Central	55,006	65,376	10,370	18·85
II. Lower North	9,465	12,237	2,772	29·29
III. Upper North	700	762	62	8·86
IV. South-Eastern	16,803	27,095	10,292	61·25
V. Western	10,634	10,861	227	2·13
Outside of Counties	70	60	— 10	— 14·29
Total State	92,678	116,391	23,713	25·59

Preliminary Estimate of Area sown with Wheat, Barley, and Oats, Season 1916–17, *in comparison with Season* 1915–16—continued.

	Oats.			
	1915–16.	1916–17.	Increase or Decrease.	
			Acres.	Per cent.
	Acres.	Acres.		
I. Central	113,609	104,259	— 9,350	— 8·23
II. Lower North	43,086	48,369	5,283	12·26
III. Upper North	2,449	3,475	1,026	41·89
IV. South-Eastern	93,158	99,068	5,910	6·34
V. Western	68,599	60,710	— 7,889	— 11·50
Outside Counties	—	35	35	—
Total State	320,901	315,916	— 4,985	— 1·55

The acreage sown for each of the last five seasons has been as follows:—

	1912–13.	1913–14.	1914–15.	1915–16.	1916–17.
	Acres.	Acres.	Acres.	Acres.	Acres.
Wheat	2,579,560	2,699,632	2,842,020	3,220,645	3,031,888
Barley	94,039	71,869	73,308	92,678	116,391
Oats	316,520	273,718	267,561	320,901	315,916

AGRICULTURAL EXPERIMENTS.—REPORT FOR YEAR 1915-1916.

[By W. J. SPAFFORD, Superintendent of Experimental Work.]

EXPERIMENTS AT HAMMOND.

(Conducted by Mr. T. GRIFFIN.)

Since 1908 Mr. Griffin has been conducting "Dry Farming" experiments with wheat growing at his farm at Hammond, on the so-called Campbell's system of dry farming. The block of land utilised each year was divided into eight plots of five acres each, and the individual plots received different methods of soil treatment but took the same variety and same quantity of wheat and the same quantity of superphosphate per acre during each year. Under the original treatments the plots were continued for six years (1908 to 1913), when four of them were discontinued, and but a single plot put in to replace them.

The following table sets out in detail what has been the results obtained from these plots and the various methods of soil treatment followed :—

TABLE 1.—*Showing Soil Treatments and Results Obtained from Cultivation Plots at Hammond from* 1908 *to* 1913.

Plot.	Soil Treatment.	1908.	1909.	1910.	1911.	1912.	1913.	Avrg. 1908-1913.
		B. L.	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.
	Fallowed.							
1	Disced ; ploughed 6in. deep ; immediately subpacked ; and thoroughly cultivated during summer.	23 41	19 22	33 37	10 0	2 28	Failure	14 51
2	Disced ; ploughed 6in. deep ; thoroughly cultivated during summer, but not subpacked.	20 27	14 49	32 0	9 17	1 56	do	13 5
3	Disced ; ploughed 6in. deep ; thoroughly cultivated during summer, and subpacked before seeding.	20 54	12 22	31 51	7 43	2 6	do	12 29
4	Disced ; ploughed 4in. deep ; immediately subpacked, and thoroughly cultivated during summer.	17 42	14 15	32 38	8 25	2 20	do	12 33
5	Disced ; ploughed 4in. deep ; thoroughly cultivated during summer, but not subpacked.	14 21	8 57	33 0	8 6	2 35	do	11 10
6	Disced ; ploughed 4in. deep ; thoroughly cultivated during summer, and subpacked before seeding.	12 22	12 26	32 1	7 21	2 58	do	11 11
	Not Fallowed.							
7	Ploughed 4in. deep in autumn, and subpacked.	14 4	15 12	27 20	3 14	1 35	do	10 14
8	Ploughed 4in. deep in autumn, and not subpacked.	12 44	16 31	23 26	2 3	0 54	do	9 16
	Rainfall.....	in. 9·84	in. 10·09	in. 17·74	in. 7·50	in. 10·77	in. 6·54	in. 10·41

Plots 1, 2, 4, and 5 were continued under the same treatments until 1915, together with a plot not ploughed but only cultivated. The results for these

years, 1914 and 1915, are set out below, with the averages over the whole period :—

TABLE 2.—*Showing Treatments of Plots and Results Obtained from Cultivation Plots at Hammond for the Years* 1914 *and* 1915, *with the Averages for the Period* 1908-1915.

Plot.	Soil Treatment.	Avrg. 1908–1913.	1914.	1915.	Avrg. 1908–1915.
		B. L.	B. L.	B. L.	B. L.
1	Disced; ploughed 6in. deep; immediately subpacked, and thoroughly cultivated during summer	14 51	Failure	3 37	11 36
2	Disced; ploughed 6in. deep; thoroughly cultivated during summer, but not subpacked	13 5	do.	3 18	10 13
3	Disced; ploughed 4in. deep; immediately subpacked, and thoroughly cultivated during summer	12 33	do.	3 8	9 49
4	Disced; ploughed 4in. deep; thoroughly cultivated during summer, but not subpacked	11 10	do.	3 27	8 48
5	Disced; not ploughed, but scarified 4in. at same time as other plots are ploughed	—	do.	3 18	—
		in.	in.	in.	in.
	Rainfall	10·41	8·57	8·87	9·99

Each year the above plots were dressed with 80lbs. superphosphate (36/38) to the acre.

These results show that subpacking the soil at Hammond is worth a bushel extra yield, providing that the operation is done immediately after ploughing. This is shown both with 6in. ploughing (plots 1 and 2, Table 2), and with 4in. ploughing (plots 3 and 4, Table 2).

When the subpacking is done just before seeding it gives no increase in the crop, indeed, it appears to have a slightly depressing effect, as is shown by a comparison of plots 3 and 2 of Table 1 where the plots were ploughed 6in. deep. At 4in. ploughing the yields from the plot not subpacked and the one subpacked immediately before seeding are almost identical (plots 6 and 5 of Table 1).

In any case an increase of 1bush. per acre brought about by subpacking the land immediately after ploughing is not nearly enough to encourage farmers to speculate on an implement for which there is no other work.

VARIETY TESTS.

Besides these cultivation tests, Mr. Griffin has, since 1908, compared various varieties of wheat grown on ordinary bare fallow and dressed with

80lbs. superphosphate to the acre. The table below sets out how these varieties have behaved during the period 1908-1915:—

TABLE 3.—*Showing Yields from Varieties of Wheats Grown at Hammond with 80lbs. Superphosphate to the Acre on Ordinary Bare Fallow.*

Variety.	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.
	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.
Federation	8 46	14 34	28 14	5 9	1 13	Failure	Failure	5 23
Yandilla King	7 43	12 41	22 4	6 9	—	do	do	8 25
Gluyas	7 10	16 41	24 49	4 20	—	do	do	8 40
Viking	7 58	16 26	21 37	8 6	—	—	—	—
Cumberland	—	15 27	22 21	5 8	2 45	—	—	—
Pratt's Comeback	7 59	14 27	27 17	—	—	—	—	—
John Brown	7 27	8 50	18 27	—	—	—	—	—
Special Comeback	—	17 27	26 55	5 20	—	—	—	—
Bunyip	—	—	—	5 42	—	Failure	Failure	—
Turkey Red	1 40	—	—	—	—	—	—	—
Firbank	—	—	—	—	1 42	Failure	Failure	—
Thew	—	—	—	—	1 8	do	do	—
Bayah	—	—	—	—	0 48	do	do	—
LeHuguenot	—	—	—	—	0 24	—	—	—
American No. 8	—	—	—	—	1 8	—	—	—
Red Russian	—	—	—	—	—	—	—	9 37
Golden Drop	—	—	—	—	—	—	—	6 35
Kerly's Early	—	—	—	—	—	—	—	5 26
King's Early	—	—	—	—	—	—	—	4 27
	in.	in.	in.	in.	in.	in.	in.	in.
Rain fall	9·84	10·09	17·74	7·50	10·77	6·54	8·57	8·87

ADVISORY BOARD OF AGRICULTURE.

On Wednesday, October 25th, the Board paid its annual visit to the Roseworthy Agricultural College. There were present Messrs. F. Coleman (chair), A. M. Dawkins, C. J. Tuckwell, W. J. Colebatch, Professor Perkins, and H. J. Finnis (Acting Secretary). The greater part of the day was devoted to the inspection of the crops, stock, and appointments generally.

Business dealt with included a notification from the Minister of Agriculture to the effect that he had reappointed to a seat on the Board for a period of two years Messrs. J. Miller, C. J. Tuckwell, F. Coleman, and G. R. Laffer, M.P. The Board was also notified that Mr. C. E. Birks had resigned from the Board.

The name of Mr. W. Gum, of Amyton, was added to the list of life members, and approval was given to the addition of 111 names to the rolls of existing Branches.

New Branches were approved as follows:—Blackheath, Edillilie, Eurelia, and Minnipa.

THE AGRICULTURAL BUREAU.

THE TWENTY-SEVENTH ANNUAL CONGRESS.

(Continued from page 212.)

Second Day—Tuesday, September 5th.

ESSENTIALS IN THE SUCCESSFUL OCCUPATION OF A SCRUB BLOCK.

A paper entitled "Essentials in the Successful Occupation of a Scrub Block," by Messrs. F. Tregenza and G. H. Wall, Coonalpyn, was read by the former, as follows:—

One must be careful in treating a subject of this title because by "essentials" one means those things which are indispensable to success. It might be easier to tabulate those things which are not important in the highest degree in the matter of making a success of a scrub block.

The type of man who will succeed is the man who possesses above all else great staying power. He needs a strong heart even more than strong muscles, because the initial work is not as laborious as it is slow and tedious. He needs abundant patience and a willingness to put in long hours when necessary. He should be of a practical type, and possess, if possible, some experience of the work to which he is going. Some have affirmed that practical experience is more to the man starting than a solid bank balance. This may be, but a man of average intelligence with £500 or less has as good a chance, if he uses his judgment and follows the best advice. In the selection of a block he must first consider the means of transporting his produce to market. However good an outback block may be, he should keep within reasonable distance of rail or river. When we consider the vast areas of good country adjacent to our railways held, but unoccupied, and think of the difficulty the would-be settler has to secure a block, and the distance from the metropolis he has to go for it, we are compelled to the conclusion "there is something wrong somewhere."

It is essential to success that a good water supply be assured. If it is not there naturally it should be the first duty of the settler to provide it by catchment. There is so much good wheat-growing mallee country well watered that one wonders sometimes why men choose a locality where there is no prospect of underground supplies. There is nothing

more unprofitable than water-carting. It is doing something for nothing, and is a direct loss to the occupier and to this country.

With regard to the plant for a scrub block, everything which is not strictly necessary is a waste. The settler should have few implements, but good, and of the types which so far have proved best suited to his district. Discarded ploughs and cultivators lying about the place generally indicate money unwisely spent. The main consideration in purchasing equipment—horses or implements—should be, is it the best I can get, within my means, to promote the productiveness of the block?

In considering the methods of working a scrub block it is well to start with a plan, and, to save after regrets, place the homestead in the most convenient working position. One must not be too dogmatic in saying how a block should be worked, because one financially handicapped cannot always do what he likes or what he knows would be the best. He can then only do all he can as well as he can. On the other hand, one may be financially strong, but lack common sense and wise management, and fail.

In the first few years of occupation of our second class mallee land only a small margin of profit should be expected; hence the need for economy in working. The cheapest methods of preparing the ground should be adopted, so long as they are thorough, and an implement to get quickly over the fallow should be used at seeding time. Many blocks are partly spoilt when firing the first rolling. There is no excuse, ordinarily, for letting a fire get out of bounds. No more scrub should be rolled than can be properly kept under. Cutting two or three year old bushes does not pay, and land which through lack of time or want of rain has to be let go becomes worse than virgin scrub to deal with. There must be constant warfare on the shoots. Dead roots do comparatively little harm in the ground. On land where the mallee is exceptionally dense one should sow as a first crop oats or a flaggy wheat of brittle straw for firing. It pays to put a man on with the fire rake, to catch the hottest of the weather, as early as possible. There is no implement more essential on a new mallee block than the fire rake. Every possible chance to scorch shoots should be taken. We hope in the near future to have a scorcher (within the reach of the beginner) for killing the shoots on other than stubble land.

To be successful one must fallow, not simply for reason of moisture conservation or, what is still more important, the sweetening of the soil, but because it is the only way the average settler can get his seed bed ready in time, there being on new land so much labor in getting the land clear of stumps, stones, and rubbish.

The wise management of a scrub block will include economy in feeding stock; looking ahead and growing small paddocks of stuff to save other feed and keep up condition. It will mean the prevention of waste and leakages in the field, in the stable, and in the house, and that attention to little things which is so essential.

In order to succeed the settler will find it essential to spend money and to employ extra help at times for the first few years to get his block in order. He should not be in too much hurry to go in for side lines, his whole energy and attention for the first two years, at any rate, should be devoted to his land, and just what buildings and fencing is necessary. As soon as the way is clear he should have sheep, erring rather on the side of having too few than too many. While, of course, sheep need considerable attention, it is beyond question that they aid materially in the extermination of the mallee, and as fallow cleaners are almost essential.

There are a multitude of things which are quite optional, but to the settler who recognises that there are essentials and applies himself diligently to them there is every prospect of success.

CAN MALLEE LAND OF A POOR, LIGHT, SANDY NATURE BE PROFITABLY OCCUPIED?

Mr. J. Gray, of Claypan Bore, read a paper entitled "Can Mallee Land of a Poor, Light, Sandy Nature be Profitably Occupied?" as follows:—

I approach this question with some amount of diffidence. I have had some experience with the cultivation of sandy soil, but not just of the class that the title of this paper indicates. Consequently I cannot speak with authority. I am approaching it with an open mind. It is really a matter of £. s. d. whether this class of land can be made sufficiently productive to repay, with a fair margin of profit, the money and labor put into it. I am hoping that in this Congress there may be "pathfinders," who out of their experience can throw more light on this subject than I can, and thus by comparing notes we may arrive at some conclusion regarding it.

The Problem.

The class of land indicated by the heading of this paper is not the class that usually gives fair returns when properly treated, viz., fairly large hills of white sand, intersected by flats of varying width, of dark or red loamy sandy soil, all covered in its natural state with a good growth, mallee, broom, pine, and other bushes, which, when

rolled down and burnt off, usually makes a good blaze, that conduces to the sweetening and general improvement of the soil. The land I have in view is that not only the higher portions of which consist of white sand, but also the intervening flats are of the same formation, where white sand predominates on the flats as well as on the hills, and where the natural vegetation is generally stunted and scanty, giving the country an uninviting, desert appearance. This class of country is usually valued by the Crown Lands Department at from 2s. 6d. to 5s. per acre. The 5s. selection generally includes some land of a better quality. South Australia has an immense area of mallee land, but, unfortunately, a great deal of it consists of this poorer class of country. A considerable area of this sort of country has already been selected, and a great deal more is being got ready for selection. Not only has the State built railways to accommodate present and prospective settlers on such country, but it has also lent goodly sums of hard cash to assist these settlers to develop their holdings. Hence the importance of the question of the successful occupation of this class of country.

The Rainfall.

Regarding the rainfall, I need only say that the class of country under review does not require a heavy average one; 10in. to 12in., if it falls at the right season of the year, will give better results than 15in. to 18in. Heat from fire and sun seems more beneficial to this class of soil than cold, wet chilly conditions arising from an excess of moisture.

Distance from Market.

In country where sand predominates the roads are usually heavy, and it cannot be profitably occupied at a long distance from a railway or sea port. Five miles is quite far enough. Otherwise much valuable time will be lost in carting supplies and produce. The social life, too, on the farm will be at a discount.

Permanent Water.

Permanent water must also be obtainable in quality and quantity suitable for stock. If it can be used for irrigation, so much the better, for a kitchen garden will be a great factor in supplying the family needs.

Method of Operation.

It is coming to be generally recognised that wheat cannot be successfully grown continuously on white sandy soil. I know of many share farmers who are only cultivating the flats and the slopes of the sandy rises, the tops being left severely alone. If in its natural state there

is a good growth of mallee and broom, so that a good burn off can be secured, these light rises under favorable conditions may give a return of about 8bush. per acre. An 8bush. crop on sand does not leave sufficient stubble to give a good fire amongst the green shoots, even with the aid of a fire rake. Consequently the subsequent crop will probably be poor, working out at about 3bush. per acre. If the cultivation is continued in the hope that ultimately, with liberal dressings of super. and good cultivation with the plough to eradicate the roots, the farmer will probably be rewarded, especially if the land has been fallowed, with a fine promise in early winter and spring that will end in takeall and disappointment at harvest time. Experience shows that where wheat fails on this light soil oats will thrive and give good returns either as hay or grain. Barley and rye will also do well on this class of soil. Most mallee farmers in the past have been reluctant to grow this class of cereals on account of the difficulty of finding a ready market for them. I am convinced, however, that if more attention had been paid to their culture before the 1914 drought there would have been large supplies of hay and other fodder on hand, the value of which at such a time would have been incalculable. This fodder could have been grown in many cases where wheat was a partial, if not a total failure. While speaking of the drought, another factor comes to mind. All meat food for human consumption has more than doubled in value, and although it is not likely to maintain its present high figure it will command a good price for many years. It becomes therefore a question whether it will not be better on the light sandy soils to go more largely for growing the class of cereals indicated, and market them principally as beef, mutton, wool and dairy produce. I know I am advocating an innovation. The usual practice is to grow wheat and wheat only in the early stage of mallee settlement, and work into what is known as by-products later on as opportunity offers. This, of course, is quite proper so far as the better class land is concerned. But I am convinced that attempting to grow wheat only on poor light sandy soil is an unprofitable business. My own experience goes to show that by taking three crops of oats in succession off this kind of land the field may then be sown with wheat with good results. Thus past experience seems to indicate rotation of crops and mixed farming for this class of soil from the start. Here, however, at present, we are up against a difficulty. Where stock are kept the land must be fenced. Fencing material has assumed war prices to such an extent that its use is almost out of the question. Let us hope, however, that we are nearing the end of this dreadful state of affairs. The war, with all its dark associations, will pass into history. But drought conditions will be our experience from time to time in the future as in the past. Thus

fencing material will become cheaper, while to a large extent beef and mutton will continue to realise good prices. At any rate, we may assume that by the time the discussion arising out of this paper becomes digested and gets into the blood of action these things in regard to prices will have become more normal.

Let us now see how the selector is to go about this business of making a success of farming this poor sandy soil. May I lay emphasis on the fact that this land has to be reclaimed and, to a large extent, made. Therefore the settler cannot afford, however much capital he may have, to buy a holding from a land jobber. It must be selected from the Government. Then it will have the advantage of being rent free for several years. The natural vegetation on this soil is usually light. By using a ribbed roller a lot of labor will be saved in cutting springbacks. It will not be a great effort to roll and burn off 400 acres in the proper time. In this area there are likely to be some better portions, such as loamy flats between the rises, say 100 acres in all. This can be sown with wheat. If twice this area of better class land can be obtained so much the better. The next best land should be sown with barley, and the balance with oats. Thus there will be approximately 100 acres under wheat, 150 acres with barley, and 150 to oats. I propose to set aside 50 acres of barley and 25 acres of oats for grazing. This should carry say five cows, a bull, and six or seven horses during the winter months and until the stubbles are ready for them. This portion of the field, of course, will have to be fenced off. Twenty-five acres of oats will probably be available to be cut for hay, and the balance of the field can be stripped for grain. There is one difficulty that must be considered in connection with growing oats and barley. Under normal conditions wheat will remain on the straw in a ripe condition for weeks without much loss. Consequently, on many farms in the mallee, where large areas are under crop, and the means of the settler are limited, the risk is accepted, and the stripping prolonged for six, and sometimes even eight, weeks. But with oats and barley, if they remain a week after they have ripened it is often found to be too long, and a considerable quantity of the grain is wasted. Where mallee land has been tilled several times this difficulty may be overcome by binding the crop in the green stage. In the case of a first crop, however, there is the problem of clearing the land of roots and sticks so that the binder may be put over the land. Then a stubble burn is a great factor in clearing the land and fertilising it for the next crop. So the method of harvesting the oats and barley is a matter of choice between saving all the crop on the one hand and the opportunity to do a little towards preparing the land for the next crop.

Let us now look at the financial aspect of the venture we have in mind:—

Estimated Cost of Tilling 400 acres of Light Mallee Soil.

	£	s.	d.
100bush. seed wheat at 3s. 6d. per bushel	17	10	0
150bush. seed barley at 3s. per bushel	22	10	0
150bush. seed oats at 2s. per bushel	15	0	0
10 tons super. at £5 per ton	50	0	0
Cultivating and drilling at 4s. per acre	80	0	0
Harvesting 325 acres at 5s. per acre	81	5	0
1,130 cornsacks	38	0	6
Interest on, say, £400 capital other than that employed in working stock, and implements, at 10 per cent.	40	0	0
	£344	5	6

	£	s.	d.
100 acres wheat at 10bush. per acre at 3s.	150	0	0
15 tons hay from 25 acres at £2 per ton	30	0	0
100 acres barley at 12bush. per acre at 2s. per bushel	120	0	0
100 acres oats at 12bush. per acre at 1s. 6d. per bushel	90	0	0
Returns from 5 cows, including calves reared	50	0	0
	£440	0	0

I have not included the cost of clearing the land, which would be about 4s. 6d. per acre, as that remains an asset on the holding, and should not be debited against the first crop. The balance to the credit of the venture of about £95 15s. is very little, but there would be a fair margin of profit on the work done on the holding at the figures allowed. Nothing has been allowed for the labor incurred in getting the return from the cows. But the skim milk not required for rearing the calves can be fed to pigs, and in a measure compensate for the work involved.

If the settler's capital is limited he will be wise to confine his operations for the second year to the field already cleared. The portion under wheat will probably stand another crop. Some of the parts that carried barley may be put to oats, and vice versa, and his mixed farming branches enlarged, converting as much as possible of his previous year's crop into dairy produce. If, however, the necessary capital is available another field may be cleared and treated in the same way as the previous one, whilst that one may be drilled with 1bush. oats and 40lbs. of super. per acre at a cost of about 7s. 6d., including 1s. per acre for rent. This may be kept entirely for a grazing paddock. If it is stocked with sheep it will probably produce 10s. worth of mutton and wool per acre. Not much of a margin, it is true; but then it must be remembered that the land by this treatment is being reclaimed and improved very materially, because after another crop of oats has been taken it will most likely give a good return when sown with wheat. The general experience is that sheep thrive remarkably well on this class of country. Various kinds of bush that sheep eat

grow on light soils, and these make a good variety of feed in conjunction with the oats that are sown for them or when they are on the stubbles. They also pick up a great deal of the grain that is lost in harvesting.

Conclusion.

We can estimate fairly accurately the probable cost of such a venture, but the difficulty is to get an accurate idea of the income. This we can only get by experience. If my estimate of probable income is near the mark, then there is a chance of this class of country being successfully occupied. But if it is too high, then the selector will be well advised not to venture. Experience indicates that poor, light sandy soil improves in producing quality when treated as I have suggested. I am convinced that the only way this class of country can be successfully occupied is by a judicious rotation of crops that will improve the land from the start.

Discussion.

Mr. F. C. Fleet (Salisbury Branch) said he had 20 years' experience of mallee farming in Victoria, and the light, sandy soil mentioned in the papers was generally left alone, unless it could be cleared sufficiently to get rid of vermin. The first thing that should be seen to in the occupation of that land was water, and he believed the Government should take steps in that direction. His experience was that the light, sandy soil was best left alone, because the heavy cost of working made it unremunerative.

Mr. A. V. Nairn (Mallala) considered that a man who went into the back country under present conditions was a bit lacking in intelligence. He knew of men who had had to subsist on water containing an ounce of salt to the gallon, because their stock was too poor to cart good water. They had been promised a water supply, pumped back from the Murray, for the last four years, but so far nothing had been done. He was not blaming one Government any more than another. They were all to blame, and not enough pressure was brought to bear on them. They all seemed to regard the "cocky" as a man used to hardships, who could put up with anything. Unless the Government put in hand a consistent policy of assistance for settlers in the back country, it was no use asking men to go on to it.

Mr. J. Sabey (Cummins) said that one big factor in the settlement of land in the Eyre's Peninsula mallee would be the establishment of a through rate of freight for imports and exports to and from Port Adelaide.

Mr. A. Jamieson (Yongala Vale) contended that any land that required railways every five miles to make it payable was not worth while bothering about.

Mr. R. F. Mayfield (Bookpurnong East) said that if a block was worth having, it was worth fencing. He referred to the importance of fallowing and the keeping of sheep. He said that continual wheatgrowing would not pay in light soil.

Mr. O. P. L. Payne (Mindarie) touched on the subject of the rolling of green scrub, which, he said, should not be done too early. Too heavy an implement was not wanted in light sandy soil. A cultivator, which would stir the soil well, would be better. He advocated fallowing every third year, and said it was unwise to clear too much land at a time.

Mr. A. B. Ferguson (Moonta) said that by cutting scrub towards the end of September one got it just when the sap had risen, and the further growth of young shoots was prevented. For the first few years he would have no sheep on scrub farms at all, because the growth of grass between the scrub was of great use in burning it off. It was his experience that sandy soil would do well with crops grown in rotation, and he advocated the sowing of oats drilled into the fallow.

Mr. John Welch (Arthurton) suggested that the growing of peas on light soil in the first place led to the growth of good wheat crops later on. Wheat land required plenty of nitrogen, and peas were very rich in that. The experiment had been tried in his district of putting sheep into the peas, and it had proved successful, for the sheep got all the good there was to be got in the pea crop, and their constant moving over the ground was not only nearly as good as fallow, but also stopped the drift. It was no use expecting a crop of wheat after barley. If they were going in for rotation of crops they would have to keep more sheep in order to pay the bill.

Mr. L. E. Cowley (Roberts and Verran) said his branch had experimented with plots and found that the most payable quantities in sowing were 45lbs. of seed and 1cwt. of super.

Mr. E. Correll (Minlaton) thought it a bad policy to cultivate light sandy rises too much. The straw should be allowed to rot into the soil. In time it would become humus, and reinforce the soil.

Professor Perkins (Director of Agriculture) said the troubles of light sandy land had affected people all the world over. When he was a much younger man he tackled a sandhill, and after struggling with it for two or three years, made a mental reservation that he would never do so again. He had often thought that, instead of try-

ing to put such land under cultivation, it would be much better to treat it as forest land. His experience was that sand always drifted, if given the slightest chance. There were, however, instances of successful occupation of sandy land in other countries. In Silesia, for example, there were vast tracts of white sand. In the south-east of South Australia there were similar tracts, and he had hopes of it, because of the good rainfall. The principle adopted in Silesia in the working of that land was to sow green crops and then to plough them in. That put a large amount of organic matter into the soil, and proper working up made it fertile. That might only be possible where a greater degree of closer settlement was possible. There was no doubt that a great deal of land which was of no use to them to-day could be made of use when population increased. After all, were they wise to take up sandy land when they had large areas of a different character available for wheatgrowing? Personally he did not think so, although he admired the pluck of the man who did. On farms where there was a fair amount of sand he would avoid breaking up that portion of it which was inclined to drift. In regard to the rotation of crops, he advised the growing of peas rather than barley, if later they were fed off. Sandy soil should be touched as little as possible. Overworking it did more harm than good. Summing up, he would say, don't put the land under crop too often. Too frequent working made it drift, and good results would not be obtained.

Mr. Colebatch (Director of Roseworthy Agricultural College) said that in many instances the trouble with sandy soil in South Australia arose out of the fact that the land was not properly looked after. He had seen a lot of fallow in light land carrying more crop than land that was under crop. What was likely to do good in light land, particularly in mallee land, was some successful form of machine which would burn off the shoots. He did not think it was too much to hope that, in a country like South Australia, which had originated such a machine as the stripper, to get someone to come out with some such machine.

Messrs. Tregenza and Gray briefly replied.

THE SHORTAGE OF AGRICULTURAL LABOR.

Mr. O. J. Murphy (Penong Branch) read a paper entitled "The Shortage of Agricultural Labor," as follows:—

One of the direct results of the war is the shortage of agricultural labor, a fact which may well give the farmer reason to rejoice. Hundreds of men engaged in the peaceful pursuit of agriculture

two years ago have gone forth to defend their country. No patriotic farmer can regret the departure from Australia of men whose work on the farm has fitted them well, both physically and morally, to become soldiers.

But it is still the duty of the farmer, who must stay at home, to produce all the wealth he can, for by so doing he will do a share towards the maintenance of our soldiers in the field of battle. The agricultural community is called upon to provide recruits, and at the same time to maintain, and, if possible, increase production. The problem confronts a great many farmers. On the Far West Coast an exodus of farm laborers was a natural consequence of the poor seasons 1913 and 1914, and the numbers have been still further reduced since the outbreak of war. Enlistment has been especially brisk since the beginning of the present year, with the result that some districts are practically drained of farm laborers. In the hundred of Cohen, one of the best wheat-producing hundreds on the Far West Coast, there are but three or four agricultural employees. Five or six times these numbers could find employment in the hundred during the coming harvest, and there is reason to believe that other hundreds on the West Coast are similarly situated. The area under crop at present is equal to, if not greater, than the area under crop last year. Farmers placed as great an area as possible under crop without the foreknowledge of how they would manage the harvest operations should the season be a favorable one. As it is, the season promises to be one of the best on record, and farmers are already on the lookout for any available sources of labor.

Co-operation among the farmers themselves has been suggested and tried to a small extent: but it is obvious that even if co-operation were extensively practised the problem of the shortage of labor would be only partially solved. A and B may help one another with advantage during the hay-making and wheat-cleaning periods, but where large areas are under crop A cannot afford to leave his matured crop and spend a week reaping on B's property. Nevertheless, the probability is that co-operation among farmers will be the main solution of the problem during the coming harvest.

The fact is recognised that the shortage of labor is a direct result of the present war, and farmers will make the best of existing conditions. But it may be well to consider further this subject forced upon our notice at the present time. The long distance of some of the newly-opened areas of the State from the capital and the absence of means for rapid transit have proved an effective barrier against obtaining good agricultural laborers. Farmers in the outlying districts have to be content with the poorer class of men, who possibly have

not been able to obtain employment in the more settled areas. This difficulty, so far as the West Coast is concerned, is bound to be mitigated as the outlying districts are brought into closer communication with the settled areas by means of the extension of railways. It is also certain that a better class of farm laborer would be attracted to the newly-settled areas if better accommodation were provided for them. Too often the quarters of the farm hand are nothing more than a hovel. Men who have not the capital to buy improved farms must look to the newly-opened-up areas for a block of land, and often for experience. The provision of better accommodation on the average farm would certainly attract more such men. It is idle to expect a man to live in a bag hut and to perform his work satisfactorily—work that is often very strenuous.

But perhaps the best solution of the difficulty of the shortage of labor would lie in encouraging the public school boy to take a greater interest in the principal industry of the State. In the experience of the writer the average school boy in the city knows little or nothing of agricultural pursuits, nor is he encouraged to learn much about them. Would not the State be benefited if more boys were to become farmers and fewer office boys and clerks? The city-bred boy, as well as the country lad, should be encouraged to follow agricultural pursuits. Undoubtedly hundreds of boys leaving school could find employment on the farm, and farmers would be only too pleased to train such boys, knowing that in them they would find a more reliable and permanent employee than in the casual laborer.

It is to be hoped that the present problem of the shortage of agricultural labor will induce those in authority to provide means for encouraging greater numbers of our boys to become agriculturists.

WHEAT-GROWING ON SALINE GROUND.

A paper entitled "Wheat-Growing on Saline Ground" was read by Mr. W. H. Richards (North Booborowie) as follows:—

This paper is confined to the two principal forms of saline ground found in the Booborowie district. The average annual rainfall of Booborowie is 16½in. The chief features of the climate are wet winters, with good growing conditions in the spring, and long, dry, and very hot summers. Summer conditions usually prevail for about five months in the year. Saline conditions are to be found in various places: they are noticeable in the shape of salt patches on the tops and sides of the small hills of the undulating country of the district, and are also to be found at the foot of practically all of our hills, where the drainage from the hill soaks into the flat ground beneath. We also have them on a swampy flat which runs right through the district.

In practically all cases saline conditions are the result of water penetrating to a considerable depth and dissolving the injurious salts which are in the earth, and as the water is drawn off by evaporation the salt is deposited on the surface of the soil in quantities sufficient to destroy plant life. That evaporation is one of the chief causes of saline conditions is clearly shown by the fact that whilst it is usually found on heavy clay soils, there is never a tendency to it in the light sandy soil, which in its natural state holds moisture almost as well as fallow land on the heavier soils.

It is likely that some salt patches may be the result of one very wet period, and that the concentration of salts is not now going on. This is the case where salt patches are conspicuous on new ground, and speedily disappear on being cultivated. The salt patches on the perfectly drained, rising ground, are probably an exception to this rule. The hills referred to are of a soft slate rock, set almost on edge, with seams of a very retentive clay, and covered with a few inches of fine-grained clay soil, and in their natural state had tussocks of black grass growing on them. In this case it seems probable that the saline matter is contained in layers of rock at no great depth beneath the surface, and is drawn up by the power of the sun. On many of these salt patches the soil and soft rock are being fretted away by the action of the salts, which is evidence that the origin of the saline matter is in the rocks which are on the surface. Here the affected land is covered with a thin layer of powdered soil and rock. If this is scraped away in midsummer, when the unaffected land is parched, it will be found that the patch is damp. This is caused by the salts absorbing moisture from the air, and how great must be the proportion of salts in the soil to gather and hold moisture in spite of the fierce heat. The salt patches at the foot of the hills are more easily explained. They have in the past absorbed great quantities of water that drained on to them from the hills above, which evaporated, leaving on the surface the salts which had previously been distributed through the earth. In connection with this, it is interesting to notice that where there is a small gutter in the vicinity there is not the least sign of a salt patch, which shows plainly the value of an efficient system of drainage in cases of this kind.

In both of these cases it will be found that the affected land does not absorb the moisture to anything like the same extent as the land which surrounds it. It will remain hard and firm even though the adjoining land is soaked to its full capacity. This is caused by a hard and apparently waterproof crust which is invariably found on these places, usually on the surface: occasionally a few inches below it. Its presence might be explained by the action of chemicals on the

soil, but it is probably caused by the entire absence of humus which has allowed the soil to run together into this exceedingly hard crust. In preparing this land for wheat it will be well to remember that the wheat plant is one of the most sensitive of cereals. It will germinate well in a very little wholesome soil, but it is necessary that it should have enough soil to germinate in.

As the salts have collected in the surface soil a deep ploughing will turn them down, and will at the same time bring soil to the surface that is comparatively free from injurious salts, and if evaporation is consistently prevented by keeping about 6in. of loose soil on the surface by cultivation, or by shielding the surface from the sun with a growing crop, the salts are not likely to rise again; but will gradually be distributed through the depths of the earth, where they will be harmless to growing crops.

Deep ploughing is also necessary in order to break the hard crust and let the water into the ground. This operation is likely to bring clay to the surface; but the depth is essential to success, and the clay is easily covered with soil by the use of a grader, in fact, if the patches are small, the ordinary methods of cultivation will soon drag sufficient soil across them to support a crop. A great improvement can be made, however, by the addition of organic matter, such as stable manure, which is excellent, or if not obtainable in sufficient quantities, cocky chaff or straw is almost equally as good. If this is done, and reasonable care taken to prevent the connection between the sun and the saline matter being re-established, permanent success is assured, and the salt patches will be seen no more. The case of swampy flat is the subject of considerable local discussion. The general opinion is that if it is effectually reclaimed it will prove to be very productive, and as it covers an area of 15 miles long by about one mile wide, it is a matter of great importance. The flat occupies a strip of country between two ranges of high hills, each a little more than a mile distant. The permanent springs are about 5ft. below the surface, but when fed by the heavy winter rains they rise until there are several inches of water all over the flat. With the end of winter the water gradually goes down, leaving behind many small lakes which, after standing a while, become salt; the water is drawn off by the sun and the salts remain in the soil. All of the affected land grows a thick mass of salt land barley grass; it germinates after the early winter rains, or after exceptionally heavy autumn rains, and when the water subsides it comes quickly to maturity, and by the time the water rises again is little more than a rotting mass. It is noticeable that although the hard crust can be found in salt patches close

to the flooded land, it is not to be found actually in the flat, where the decaying grass forms an abundant supply of humus.

Before any method of cultivation can be successful in cases of this kind, the water, together with the injurious salts, must be removed by drainage. Open drains are recommended, as they are quickly and cheaply constructed by means of a plough and scoop. The levels of the ground should be taken, and the drains laid out in a system that will keep the water moving. If the drains are large enough and properly constructed, it will be found that the winter rains, which formerly were the cause of the trouble, will gradually wash the salt out of the land and into the drains. However, the land should be cultivated and treated as saline. It should be fallowed early in the season to a depth of at least 6in., and in order to allow the soil which otherwise is sour, to aerate, it should be allowed to remain in a rough state as long as winter conditions prevent the danger of evaporation. It should then be broken down, and should be kept cultivated through the summer to a depth of 4in. to prevent evaporation.

The ground should be carefully graded to prevent surplus water being held in hollows instead of going into the drains. Seeding operations should be the same as on other land, and having produced a crop, the straw should not be removed during the summer months, as it protects the soil from the fierce heat. With careful and systematic attention there is no doubt that wheat can be grown, even on land badly affeced with salts, with a remarkable degree of success.

DISCUSSION.

Mr. H. Waters (Renmark) said the experience of fruitgrowers was that the deeper they cultivated the less evaporation would go on, and by reducing evaporation they would reduce the amount of salt rising to the surface.

Mr. A. G. Collis (Mypolonga) said there was much difference of opinion on the swamp blocks with reference to shallow or deep ploughing. Personally, he considered deep ploughing in the swamp country was not wise.

Mr. A. A. Jefferies (Mount Bryan) said for land such as had been referred to by Mr. Richards the cultivation of various fodder grasses was better than wheatgrowing.

The Director of Agriculture said, in dealing with that class of land, they should, instead of a cultivator, use a multi-furrow plough to turn up the ground, in order that there might be sweet soil on the surface and salt below. An early cereal could be sown, such as barley, which grew quickly and ripened before the salt could be brought back to the surface.

(To be continued.)

THE AGRICULTURAL OUTLOOK.

REPORT FOR MONTH OF OCTOBER.

The following reports on the general agricultural condition and outlook of the areas represented by the Government Experimental farms mentioned below have been prepared by the respective managers:—

Eyre's Peninsula.—The weather has been comparatively cool, several sharp morning dews were noticed. Light rains fell, scattered over the opening fortnight, and a good, steady rain was received on 22nd and 23rd inst.; 182 points of rain were registered for the month, as against 41 points for October, 1915. Strong winds at the latter end of the month laid down rank patches of the crops. Crops are filling their ears splendidly. Hayeutting in the district is completed, only a small area being converted into hay this season. Natural feed is in abundance, and stock are in first class condition.

Kybybolite.—Weather conditions have been entirely satisfactory to farmers; 217 points of rain fell, and this was so distributed as to give a fairly even amount of rain and sunshine for each week of the month. Temperatures have been generally mild, but one sharp frost was experienced. A gale of wind on the night of the 22nd caused some damage to very forward crops. Crops almost invariably look well, and are just coming out in ear. Takeall is noticeable, but is not showing extensively. Summer crops are getting a good start; the germination of kale promises good results with that valuable crop. Natural feed is now at its best; it is running up to the flowering stage, and shows a length of from 9in. to a foot. It is said to be many years since feed has been as plentiful as at present. Stock—Horses and cattle are looking very well; sheep on natural pastures do not compare with those feeding on cultivated fodders as well—the former do not pass a certain standard of improvement whatever the food conditions. The difference is even more marked in the growth of the lambs. Shearing operations are well advanced, and a good clip is being obtained. Miscellaneous—The rains have extended the average fallowing season, and the ploughs have been kept going; the ground will become too hard to continue, however, after the first dry weather.

Turretfield.—The weather during the month has been very changeable, varying from mild temperatures to cold and boisterous conditions. Three heavy frosts were recorded, and the rainfall totalled 193 points, of which 1in. was registered on the 22nd. Winds of hurricane force were experienced at times. All crops are now fairly advanced and looking well. The oat and barley crops promise heavy returns. The frosts did no damage to the cereal crops, but some vineyards suffered considerably. Potatoes, too, were affected. In one instance, of three varieties planted at the same time under the same conditions and growing side by side, one (Carmen) was cut badly, but the other two (Up-to-date and Pinkeye) were not at all affected. Natural feed has gone to seed, but there is a plentiful supply, and it seems to be of high nutritive quality. Horses and cattle are thriving well on it, and the practice of turning the stock into the paddocks instead of feeding them in the stable is at present generally adopted in this district. All stock are wonderfully fit and in excellent condition. Miscellaneous—Preparations for haymaking are in full swing, and operations will probably be started at the beginning of November.

Veitch.—Weather conditions have been very mild this month; hardly any warm weather has been experienced. Rain for the month, 164 points; average for Veitch, 56 points. Have had a few frosts, which appear to have done a little damage to crops in different parts of the district. Crops are all heading well, and look promising. Natural Feed—Good, but is now turning color. Stock all in marketable condition. Haymaking operations have started on many farms.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall for the month of and to the end of October, 1916, also the average precipitation to the end of October, and the average annual rainfall.

Station.	For Oct., 1916.	To end Oct., 1916.	Av'ge. to end Oct.	Av'ge. Annual Rainfall
Far North and Upper North.				
Oodnadatta	2·03	7·89	3·94	4·76
Tarcoola	2·40	5·65	6·48	7·58
Hergott	2·24	5·32	4·97	6·04
Farina	1·62	6·31	5·62	6·70
Leigh's Creek ...	1·50	6·00	7·32	8·66
Beltana	1·17	7·05	7·77	9·22
Blinman	1·53	10·17	11·16	12·83
Hookina	1·71	16·23	—	—
Hawker	2·00	16·58	10·57	12·22
Wilson	2·68	16·55	10·34	11·78
Gordon	1·81	12·49	8·97	10·26
Quorn	3·11	17·62	12·30	13·78
Port Augusta ...	1·27	9·40	8·26	9·46
Port Augusta W.	1·29	9·49	8·24	9·36
Bruce	1·82	10·76	8·85	10·01
Hammond	1·37	10·64	10·02	11·46
Wilmington	3·05	19·57	16·38	18·26
Willowie	1·36	12·67	10·58	11·90
Melrose	3·92	27·50	20·90	23·04
Booleroo Centre..	2·39	16·31	14·01	15·83
Port Germein ...	1·48	8·28	11·28	12·84
Wirrabara.....	2·40	24·29	17·01	18·91
Appila	1·99	14·94	13·21	15·08
Cradock	1·30	9·54	9·62	10·86
Carrieton	1·28	13·41	10·61	12·22
Johnburg	0·96	10·60	8·77	10·21
Eurelia	1·60	13·66	11·56	13·24
Orroroo	1·48	13·78	11·78	13·42
Black Rock	1·14	12·88	10·59	12·25
Petersburg	1·98	13·81	11·31	13·07
Yongala	1·99	16·49	12·09	13·94
North-East				
Ucolta	1·90	12·19	—	—
Naokara	0·92	9·97	—	—
Yunta	0·30	7·46	6·94	8·22
Waukaringa	0·64	8·62	6·74	7·94
Mannahill	0·27	7·45	7·05	8·46
Cockburn	0·97	9·10	6·74	7·97
Broken Hill, NSW	1·26	9·09	8·24	9·63
Lower North.				
Port Pirie	1·34	13·82	11·82	13·21
Port Broughton .	1·43	17·03	12·97	14·33
Bute	1·67	19·27	14·12	15·42
Laura	1·87	19·08	16·33	18·22
Caltowie	2·22	17·09	15·27	17·27
Jamestown	2·30	19·16	15·39	17·46
Gladstone	1·90	15·91	14·23	16·00
Crystal Brook ...	2·41	17·40	13·99	15·62
Georgetown	2·04	19·20	16·38	18·32
Narridy	1·49	14·93	15·08	16·79
Redhill	2·03	19·57	15·18	16·79

Station.	For Oct., 1916	To end Oct., 1916.	Av'ge. to end Oct.	Av'ge. Annual Rainfall
Lower North—*continued.*				
Spalding	2·88	22·86	17·87	20
Gulnare	2·06	20·15	17·83	19
Bundaleer W.Wks.	2·50	20·99	15·22	17
Yacka	1·87	17·55	13·71	15
Koolunga	2·00	17·97	14·30	15
Snowtown.....	2·34	21·01	14·21	16
Brinkworth	2·26	20·58	13·92	15
Blyth.....	2·32	19·52	14·75	16
Clare	3·36	28·96	22·03	24
Mintaro Central .	3·66	30·23	24·00	27
Watervale.....	3·87	32·75	24·66	27
Auburn	3·06	23·76	21·95	24
Hoyleton	2·19	17·13	16·45	18
Balaklava	1·51	14·78	14·31	16
Port Wakefield ..	1·20	15·21	14·01	15
Terowie	1·69	13·56	11·79	13
Yarcowie	1·71	15·16	12·19	13
Hallett	1·58	15·62	14·41	16
Mount Bryan ...	2·26	22·25	14·19	15
Burra	2·58	22·27	16·06	18
Farrell's Flat	2·71	21·15	17·49	19
West of Murray Range.				
Manoora	2·43	21·09	16·30	18
Saddleworth	2·22	18·58	17·65	19
Marrabel	2·43	25·36	17·04	18
Riverton	2·06	23·46	18·41	20
Tarlee	1·60	18·31	15·55	17
Stockport	2·11	19·70	14·15	15
Hamley Bridge ..	2·09	18·16	14·66	16
Kapunda	2·30	22·49	17·72	19
Freeling	2·22	20·62	15·85	17
Greenock	2·26	27·37	19·15	20
Truro.....	2·76	24·16	17·78	19
Stockwell	2·29	23·05	18·11	20
Nuriootpa	2·18	24·37	19·03	21
Angaston	2·61	27·14	19·87	21
Tanunda	2·81	25·18	20·01	21
Lyndoch	3·04	24·15	20·81	22
Adelaide Plains.				
Mallala	1·40	15·21	15·17	16
Roseworthy	2·14	18·04	15·51	17
Gawler	1·96	21·40	17·29	19
Two Wells	1·48	16·14	14·78	16
Virginia.....	1·56	17·05	15·83	17
Smithfield	1·56	18·58	15·57	17
Salisbury	1·57	13·55	16·75	18
North Adelaide ..	2·30	27·33	19·56	21
Adelaide	1·93	23·65	18·06	20
Brighton	1·57	23·72	17·88	20
Glenelg	1·44	21·97	16·57	18

RAINFALL—*continued.*

Station.	For Oct., 1916.	To end Oct., 1916.	Av'ge. to end Oct.	Av'ge. Annual Rainfall.
Adelaide Plains—*continued.*				
gill	1·67	22·39	13·27	25·69
n Osmond ...	2·59	20·05	22·92	25·26
cham	2·23	26·27	21·39	23·47
lair	2·41	18·16	26·15	28·64
Mount Lofty Ranges.				
ıtree Gully....	2·46	27·62	25·40	28·19
rling West ...	4·74	48·56	42·76	46·70
aidla	4·36	48·60	40·68	44·35
rendon	2·46	32·63	30·67	33·67
rphett Vale ..	1·97	23·70	21·00	23·32
arhunga	2·20	22·17	18·51	20·28
lhunga	2·42	26·62	23·85	25·98
linga	1·80	21·32	18·47	20·34
manville	1·42	23·25	18·92	20·65
halilla.....	2·00	37·69	20·97	22·78
e Jervis	0·88	14·27	14·96	16·34
nt Pleasant .	3·66	30·86	24·57	26·87
mberg	3·70	32·28	26·80	29·38
neracha	3·56	34·39	30·32	33·30
thal	4·29	30·79	32·56	35·38
oldide	3·51	31·57	29·18	31·87
ndorf	3·04	31·68	32·46	35·45
me	2·58	26·52	26·32	28·83
nt Barker ...	3·41	33·20	28·31	30·93
unga	4·13	33·56	30·12	32·83
desfield	3·27	32·04	27·96	30·72
dows	4·24	40·59	32·39	35·52
thalbyn	2·05	19·28	17·50	19·28
Murray Flats and Valley.				
llington	2·10	14·53	13·29	15·01
ng	1·92	12·58	14·57	16·08
ghome's Brdg	1·62	12·66	13·53	15·27
na Bend	2·00	14·12	—	—
ray Bridge ..	1·90	12·97	12·68	14·32
lington	1·55	14·95	14·06	15·65
mum	2·51	12·43	10·45	11·67
mer	2·44	16·23	13·86	15·60
an	2·02	14·86	10·66	11·92
achetown	1·92	8·42	9·30	10·71
unda.....	3·31	20·80	15·42	17·33
herlands	2·84	14·47	9·24	10·60
gan	1·41	10·19	7·87	9·29
rland Corner .	1·03	8·71	9·67	11·42
mark	1·08	10·32	9·24	10·93
ton	1·68	13·60	—	—
West of Spencer's Gulf.				
la.....	1·98	10·22	9·04	10·13
te Well.....	1·25	11·12	8·15	9·67
ler's Bay ...	1·02	13·35	11·25	12·11
ong.....	0·99	8·96	10·77	11·93
ıt Bay	1·04	13·50	—	—
ky Bay	1·45	13·56	—	—

Station.	For Oct., 1916.	To end Oct., 1916.	Av'ge. to end Oct.	Av'ge. Annual Rainfall.
West of Spencer's Gulf—*continued.*				
Streaky Bay.....	1·16	11·87	14·25	15·31
Port Elliston	0·92	17·16	15·38	16·49
Port Lincoln	1·65	21·79	18·41	19·88
Tumby	1·65	14·89	13·72	15·00
Carrow	1·64	16·46	—	—
Cowell	1·67	10·28	10·69	11·76
Point Lowly	1·32	10·90	10·71	12·21
Yorke's Peninsula.				
Wallaroo	1·51	16·75	12·83	14·05
Kadina	1·89	19·52	14·62	15·88
Moonta	1·33	19·11	13·92	15·22
Green's Plains ...	1·57	18·48	14·54	15·73
Maitland	2·29	27·62	18·31	20·08
Ardrossan	2·04	17·47	12·66	13·89
Port Victoria ...	1·56	19·89	13·84	15·20
Curramulka	1·52	19·61	17·04	18·51
Minlaton	1·47	23·02	15·98	17·41
Stansbury	1·81	18·95	15·66	17·06
Warooka	1·37	19·46	16·44	17·71
Yorketown	1·06	18·99	16·04	17·47
Edithburgh	1·34	19·08	15·90	16·48
South and South-East.				
Cape Borda	1·82	23·12	23·34	25·09
Kingscote	1·35	20·29	17·35	18·95
Penneshaw	1·20	19·43	19·63	21·34
Cape Willoughby.	1·91	24·19	17·63	19·69
Victor Harbor ...	2·05	17·90	20·30	22·18
Port Elliot	2·18	17·04	18·46	20·33
Goolwa	2·03	18·04	16·21	17·93
Pinnaroo	2·24	16·64	14·63	16·74
Parilla	1·73	17·07	—	—
Lameroo	1·83	17·95	14·51	16·55
Parrakie	1·11	15·20	—	—
Geranium	1·00	17·76	—	—
Peake	1·98	17·15	—	—
Cooke's Plains ..	2·18	17·70	13·15	14·74
Meningie	2·14	21·25	17·02	18·87
Coomandcook	2·18	19·96	—	17·49
Coonalpyn	2·06	19·30	15·63	16·80
Tintinarra.....	2·49	20·82	16·57	18·78
Keith.....	2·00	18·66	—	—
Bordertown	1·82	18·08	17·39	19·76
Wolseley	1·65	17·91	15·84	17·72
Frances	1·86	17·13	18·26	20·74
Naracoorte	2·27	20·47	20·13	22·60
Penola	2·46	22·34	23·91	26·78
Lucindale	1·98	20·13	21·00	23·32
Kingston.....	2·14	21·96	22·32	24·73
Robe	2·25	26·76	22·61	24·69
Beachport.....	2·29	28·36	25·22	27·51
Millicent	2·74	30·69	26·66	29·25
Mount Gambier .	3·09	28·86	28·41	32·00
C. Nrthumberland	2·29	24·35	24·01	26·63

DAIRY AND FARM PRODUCE MARKETS.

A. W. Sandford & Co., Limited, report on 1st November:—

BUTTER.—The weather during the month of October was all that could be desired for the dairying industry. Further rains were experienced throughout the agricultural areas, and production has so increased that the surplus of butter for export is substantially greater than was the case a month ago. The prices of butter in pound prints at the close of the month, in accord with the Federal proclamation, were:—"Alfa," 1s. 4½d.; "Primus," 1s. 4d.; third grade creamery, 1s. 2½d. to 1s. 3½d.; choice separators and dairies, 1s. 0½d. to 1s. 1½d.; store and collectors', 11¼d. to 1s. per lb.

EGGS.—The quantities coming forward continue to be heavy, but with the excellent weather that has ruled, and so favored the quality, values have shown very little fluctuation. Interstate buyers and local picklers are still operating, and thus the floors are kept well cleared. Quotations, loose, at mart, hen, 8¾d. per dozen; duck, 10d.

CHEESE.—There is no alteration in this line to report, and though quantities arriving from factories are greatly in excess of those of a month ago, yet with substantial trade both east and west values have maintained, prices being from 7¼d. to 8d. per lb. for large to loaf.

HONEY.—The market is not quite so strong in honey, and values are now 3½d. per lb. for prime clear extracted. Beeswax saleable at 1s. 6d. per lb.

ALMONDS.—Last season's stocks are exhausted, and the new crop has not yet come to hand. Prices nominally, Brandis, 9½d.; mixed softshells, 8½d.; hardshells, 4d.; kernels, 1s. 6d. per lb.

BACON.—Curers have been able to secure sufficient quantities of the live hog, so that local cures of bacon are quite ample for trade requirements. Prices are ruling at a little easier than those chronicled in October. Best factory cured sides, 11½d. to 1s. 0½d. per lb.; hams, 1s. 2d. to 1s. 3d. per lb.

LIVE POULTRY.—Supplies of poultry during the month have been very short buyers experiencing difficulty in securing anything like trade wants, so that there is no easing in rates, and good prices are likely to rule from now on to Christmas. Heavy weight table roosters, 4s. to 4s. 8d. each; nice conditioned cockerels, 3s. to 3s. 10d.; plump hens, 3s. 1d. to 4s. 5d.; ducks, 4s. to 5s.; geese 4s. 6d. to 6s.; pigeons, 8d. each; turkeys, from 7½d. to 10½d. per lb. live weight for fair to good table birds.

POTATOES.—Old potatoes, so far as production in South Australia is concerned are now finished for this year. As the locally-grown crop of new ones is hardly yet ready to dig, the Adelaide market is for the present being supplied entirely from Victoria. Prices have therefore adjusted themselves in accordance with the quotations at the source of supply. ONIONS.—The new season's supply of locals is now available, so the demand for imported old ones is very limited. Quotations:—Potatoes, £9 to £9 10s. per ton on trucks, Mile End or Port Adelaide. Onions, new, 10s. per cwt. in the market; old, £5 per ton on trucks, Mile End or Port Adelaide.

THE AGRICULTURAL BUREAU.

CONFERENCE OF HILLS BRANCHES.

The Annual Conference of the Hills Branches was held at Morphett Vale on Thursday, October 13th. There were present, in addition to a large number of delegates, the Hon. R. P. Blundell, M.P. (Minister of Industry), Messrs. G. R. Laffer, M.P., G. Jeffrey, and C. J. Tuckwell (members of the Advisory Board), D. F. Laurie (Poultry Expert), and H. J. Finnis (Acting Secretary Advisory Board).

MINISTER'S OPENING SPEECH.

Before declaring the Conference open, the Hon. R. P. Blundell, M.P., apologised for the absence of the Minister of Agriculture (Hon. C. Goode, M.P.), who was in another State in connection with the problems affecting the wheat harvest.

One of the problems producers would have to discuss, he said, was that which confronted Australia in connection with the cause of Empire. He noticed that 369 members of the various branches of the Agricultural Bureau had enlisted for service at the front, which showed that in the great crisis the men on the land recognised no politics or differences. There must be no party or politics, but a recognition of country and nation only. The producers could not shut their eyes to the present situation. Probably, in common with every other section of the community, they would be asked to make greater sacrifices in the future, and spare every eligible man, so that if possible they could take their places in the firing line. It would mean a tax upon production in many cases, and a serious problem, but he asked them to put on one side all thoughts of self, and to realise that any request for additional sacrifices would not be made unless those who made it felt there was a great need for it. He believed the producers would meet all difficulties, and do their duty to the Empire.

Harvesting the Coming Crop.

He desired to clear up a misunderstanding regarding the gathering of the forthcoming crop. It was said that many of the men on the land had looked upon the proposals submitted to the people as something of which, in the national interests, they were forced to take an adverse view, because they felt that the bountiful harvest that seemed to be assured should be gathered, and that it would be wrong if they did not reap and store the grain for the purpose of feeding not only the people of Australia, but also of their friends who were fighting for them on the other side of the world. No one in the community desired that one bag of wheat should be wasted, or allowed to rot. Men were now being called up for home service, and to take those men and keep them in the camps while it was imposible for the farmers to get the necessary labor to take off the crops would be a criminal action. That was not going to happen, however. Every man who was eligible would be expected to register his name and offer for service, but all who went into camp and were required to assist in taking the crop off would

be immediately released until the work was completed. After that they would be expected to return to the camp and later follow their comrades into the trenches. He was not asking the producers to vote one way or another, but self must be placed absolutely to one side. It was for them to do their duty.

Fruit for the People.

It was of course recognised in South Australia that the wealth of the community depended upon the energies of the men on the land, and that manufactures had been a secondary consideration. It was hoped that there would be industrial expansion in the near future. He referred to the disposal of the fruit crop, and submitted that the scheme devised and carried out last season by the Government in conjunction with a committee of growers, with a view to increase local consumption, was a success. It was hoped that the growers would continue that policy in connection with the coming and succeeding crops. If that was systematically done there was no doubt that in time the local market would prove to be of greater value to the producers, especially in regard to apples, than the oversea markets were. As a result of annual "apple days" the consumption of apples in America and Canada had been immensely increased. After having referred to the obligations of the State in relation to the settlement of returned soldiers on the land, the Minister indicated that steps would have to be taken to open up fresh markets so that the increased production would not become a glut on the local market. In the matter of fruit it was intended to ascertain what the prospects were in the United States, whither at the earliest opportunity a capable man would be sent to mke full inquiries. He thought that last season's apple crop had been marketed satisfactorily. About 100,000 cases had been exported, and on the whole the prices had exceeded expectations. For fruit sold through the Trade Commissioner, 4s. 6d. and 4s. 9d. a case at Port Adelaide, which was equivalent to 2s. 9d. to 3s. in the orchard, had been obtained. The Minister spoke of the necessity for the maintenance of a high standard of quality, and appealed for greater co-operation among the growers.

THE RURAL POPULATION.

In a paper, "Some Reasons that our Young Men leave the Country for the Towns," Mr. C. Ricks, of the Cherry Gardens Branch, said the man or woman working the land should have the best conditions under which to live, but in many cases the homes they inhabited were of the worst type. That applied not only to the farmer, but to the laborer as well, in the districts represented at the conference. A comparison with the homes and the social conditions of workers in the city would reveal one of the reasons for the people leaving the country for the city. Short leases and high rents also acted in the same direction.

HAY AND CHAFF.

Mr. H. Pope, of the Mount Barker Branch, contributed a paper on this subject. The uses of hay and chaff were dealt with, and the view expressed that the practice of feeding sheep on chaff would become much more general, as that class of stock did splendidly on it. The production of good chaff presupposed the production of good hay.

which would involve the need of clean land and the use of clean seed. In the drier districts the development of wild oats could be prevented to a certain extent by fallowing and cultivating, but in that district it would be found better to sow rape or peas, which would generally ensure a good hay crop, and help to clean the land, to say nothing of the sheep feed provided. Tuscan, Marshall's No. 3, Marshall's Majestic, Crossbred 53, Yandilla King, and King's Early were a few of the hay wheats that did well in that district. He favored sowing a mixture of wheat and oats for hay; Algerian oats and a late variety of wheat would be found to make a good combination. Mixing the cereals in that manner tended to check the development of rust in the wheat, and less trouble was occasioned through takeall. As a general rule, it would be found that the mixed hay would weigh more heavily than wheaten hay alone. Early sowing was recommended, for that gave the young plant a chance to develop before the wet and cold weather set in. Further, the roots prevented the land washing so badly.

Hay that was to be fed to horses or sold, should be allowed to become nearly full in the head before it was cut. Algerian oats, if cut green, had a tendency toward a bitter taste, and were unpalatable to the stock. Wheaten hay for cows should be cut as soon as the bloom was off. Where the binder was used it was essential to see that the sheaves were tied properly. In warm weather wheaten hay could be stooked directly after the binder, but oaten hay should be allowed to lie for at least half a day, unless small stooks were built. Small stooks, however, were undesirable, as wind was likely to overturn them, resulting in the hay becoming bleached, and losing weight. A round stook, with the sheaves standing upright, would be found most satisfactory. Plenty of dry straw should be put down on the site of the stack. It was most profitable to store the hay in a shed. Thatching might answer the purpose, but there was a risk of damage through rough weather. The quality of the hay improved for the first 12 or 18 months, but after that generally there was trouble with the mice.

In regard to the question of chaffing, in the summer months it was found beneficial to toughen the hay before it was chaffed. On small holdings where steam was not available, water could be used with advantage, the hay being damped at least 24 hours before it was chaffed. Prior to being watered, the hay should be stacked with butts up; that allowed the moisture to penetrate the sheaves more satisfactorily. In order that the work might be performed satisfactorily, the hay and the chaffcutter should be in good order, and a good man should be available to feed the cutter. It was a mistake to feed too closely to the rollers, as, in addition to the risk of the operator losing fingers, it was not possible to keep the machine evenly fed. The knives should be evenly set, and care should be given the steels, which should not be allowed to become worn badly. It was advisable to have part of the elevator covered with perforated zinc, in order to provide a means of escape for the dust. As a general rule he preferred cutting the chaff to the middle gauge. One ton was sufficient to cut before the knives were resharpened. He thought the oil engine the most satisfactory power for chaffcutting.

At the conclusion of the paper an animated discussion took place.

FREE PARLIAMENT.

On the motion of Mr. H. B. Walsh (Port Elliot), seconded by Mr. T. G. Rowe (Inman Valley), it was decided that in future the Conference should be held not later than the 1st October in each year. The next gathering was to take place at Cherry Gardens.

A resolution moved by Mr. C. J. Blakely (Longwood), seconded by Mr. C. Ricks (Cherry Gardens), objecting to the manner in which papers read before Branches were reduced for insertion in the *Journal*, was carried.

POULTRY.

The Poultry Expert (Mr. D. F. Laurie) gave an address on poultry foods and feeding.

PIG BREEDING AND FEEDING.

Mr. L. C. Spencer, of the Clarendon Branch, submitted a paper on this subject. He said, "In ordinary circumstances the pig is a very profitable animal. The Berkshire has proved itself to be the best all round breed to keep. It is very hardy, thrifty, and fattens readily. If one desires to market pigs as porkers, a cross with the Essex is advisable. This breed is naturally a good doer. Other breeds, such as York and Tamworth, when feed is taken into consideration, are not so profitable as the Berkshire or the Essex. The selection of a sow is the most important point. One should select a good doer, not necessarily a pure bred. She should be slabby and deep, with not less than 12 teats, and reared from a good milk producing mother. Young sows are most profitable. An old sow may be more careful with her young pigs, but is very often seen with an uneven litter.

There is a danger for the first two or three days of the sow overlying her young. If a rail is placed 8in. or 10in. from the ground along the side of the sty, it will give them a way of escape, as the sow practically always goes down on to her knees and down with her back to the side of the sty. The young boars should be castrated at the age of three to four weeks, and by that time should start to feed, receiving a little milk and pollard (no more than they will eat up clean) away from the sow. At six weeks old they should be weaned. If this is done they will not miss their mother in the least and will not have the slightest check, providing they are fed at least five times a day for a few days and then three times a day till fit for market. Feed them properly from the start, give them all they can eat, then they will eat less and do better. But bear in mind that, however well they are fed, they will not yield the best returns unless they are comfortable, and they must have a good bed. It does not pay to keep a pig about for seven months when it can be raised to the same value in five months. Always keep a supply of charcoal on hand. Mangolds should be grown, as these tend to keep the pig in health. If possible, avoid having a number of pigs to feed during the cold winter months. When it is necessary to buy all feed, pollard is the most profitable. It is a mistake to rear good forward stores and market them, for in a month or six weeks they would double their value. Topping up pays the best. A tip top pig always realises a tip top price.

THE HONEY BEE.

In a paper dealing with this subject, Mr. J. R. Coles (Longwood Branch) mentioned that the flavor of the honey depended upon the source from which it was gathered. Hives could be manufactured from kerosene cases, by knocking the cases apart, and cutting a rabbet ⅛in. deep, and half the width of the board in the top of each end. That would carry the frames, which should hang at least ⅜in. clear of the bottom board. When the sides were nailed on, a box 9in. deep by 14in. long by 18½in. inside measurement was secured. A weatherproof cover was necessary, and he advocated the use of gable end covers fitting over the hive. If spare hives were placed in suitable sunny spots in the apiary, it would probably result in swarms issuing from parent colonies taking up a place in these. If a swarm clustered on a bush or branch of a tree, it was a good plan to take a frame of brood and honey from another swarm, and place it in a hive with empty frames on either side; then place the hive directly under the cluster and give the branch a violent shake. The bees would generally drop straight into the hive, and should be smartly covered. As soon as they had settled they could be removed to their permanent site in the apiary. The hive should be removed to their permanent site in the apiary. The hive should be visited occasionally, and by moving the frames the bees encouraged to extend the brood chamber. The apiarist should endeavor to equalise the strength of his colonies by giving to the weaker frames of brood taken from the stronger.

PIGS.

A paper with the heading, "A Few Notes on Feeding Pigs," was contributed by Mr. W. J. Rollbusch, of the Woodside Branch. He took it that the aim of the pig breeder should be to treat his animals in such a way that they would grow into profit as quickly as possible. However, there were many persons who kept their pigs hanging on for two or three months in a half-fed condition, and then commenced to give them more and better food, but in many cases the animals did not develop into the class of stock that could have been expected had they been properly treated from birth. He had noticed a farmer feeding his pigs on a small quantity of pollard, mixed into a large quantity of water. As a result the animals filled themselves, but were unable to secure enough nurtiment to enable them to fatten. Whilst pigs required an abundance of water, it was a mistake to make their food too sloppy. The proportion which he adopted was, say, 6lbs. of pollard to 10lbs. of water; if milk were available a slightly larger quantity was used. Charcoal very materially assisted in promoting the health of the animals. As much of the food as they would eat should be given raw. Mangolds, potatoes, thistles, dandelions, apples, and the like he had cooked and mixed with the pollard, and the growth of the animals resulting from such foods had been satisfactory. It was unwise to mix too much food at one time. The animals would not do well, or fatten quickly if given many apples. A pig, properly looked after, should be ready for market at from four and a half to five months, weighing not less than from 105lbs. to 110lbs. Exclusive of food raised on the property, such as milk and fruit, the cost of feeding per head on his holding had been not more than 15s.

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

INDEX TO AGRICULTURAL BUREAU REPORTS—*continued.*

Branch.	Report on Page	Dates of Meetings. Nov.	Dec.	Branch.	Report on Page	Dates of Meetings. Nov.	Dec.
Minnipa	*	—	—	Quorn	*	4	9
Mintaro	310	4	9	Ramco	‡	16	—
Mitchell	*	—	—	Redhill	311	7	5
Monarto South	‡	—	—	Renmark	325	—	—
Monteith	*	—	—	Riverton	314	—	—
Moonta	†	11	16	Roberts and Verran	320	7	12
Moorlands	*	—	—	Rosenthal	315	—	—
Morchard	‡	11	9	Rosy Pine	326	8	—
Morgan	‡	4	—	Saddleworth	†	—	—
Morphett Vale	331	—	—	Salisbury	315	6	5
Mount Barker	‡	8	6	Salt Creek	†	—	—
Mount Bryan	*	—	—	Sandalwood	336	—	—
Mount Bryan East	312	11	16	Sherlock	327	—	—
Mount Compass	†	—	—	Spalding	*	—	—
Mount Gambier	336	11	9	Stirling's Well	328	11	—
Mount Hope	320	17	15	Stockport	316	10	—
Mount Pleasant	*	—	—	Strathalbyn	331	7	5
Mount Remarkable	*	1, 29	—	Sutherlands	*	—	—
Mundalla	†	—	—	Tantanoola	*	4	2
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Murray Bridge	322	7	9	Tatiara	*	4	2
Mypolonga	†	8	6	Tintinarra	*	—	—
Myponga	*	—	—	Two Wells	316	—	—
Myrla	*	—	—	Uraidla and Summert'n	330	6	4
McNamara Bore	*	—	—	Waikerie	329	10	15
Nantawarra	316	—	—	Warcowie	*	11	16
Narracoorte	334	11	9	Warrow	*	—	—
Narridy	*	18	16	Watervale	†	—	—
Narrung	*	11	16	Wepowie	308	4	2
Netherton	328	—	—	Whyte-Yarcowie	†	—	—
North Booborowie	311	—	—	Wilkawatt	*	—	—
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Parilla	*	9	7	Wirrega	*	—	—
Parilla Well	*	—	—	Wollowa	*	16	21
Parrakie	*	4	2	Woodleigh	‡	—	—
Paskeville	*	—	—	Woodside	*	—	—
Penola	*	4	2	Wynarka	327	11	—
Penong	*	11	9	Yabmana	*	—	—
Petina	*	—	—	Yacka	*	—	—
Pine Forest	*	—	—	Yadnarie	320	—	—
Pinnaroo	*	10	8	Yallunda	*	—	—
Pompoota	*	9, 23	7, 21	Yaninee	‡	—	—
Port Broughton	*	—	—	Yeelanna	†	—	—
Port Elliot	331	18	16	Yongala Vale	‡	6	4
Port Germein	*	—	—	Yorketown	*	—	—
Port Pirie	*	4	9				

*No report received during the month of October. † Formal report only received.
‡ Held over until next month.

ADVISORY BOARD OF AGRICULTURE.

Date of Meeting—November 8th, 1916.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD.)

ARDEN VALE AND WYACCA, October 2nd.—Mr. P. A. Hannemann read a paper entitled, "Ploughs and Cultivators," in which he dealt mainly with the question of providing larger implements. He considered that the four-furrow plough, which was generally used for fallowing, could be increased to six or seven furrows and could be built on lighter lines. In that way more work could be done at the most convenient time. The cultivator could not be enlarged much. In the discussion which ensued, the opinion was expressed that larger implements could be used on even, easy working land, but for uneven land, in which there were stumps or stones, the smaller and stronger implement was essential.

WEPOWIE, September 20th.—Mr. F. W. Roocke read a paper dealing with the care of farm horses. He advocated good stabling accommodation and the feeding of the horses, after the day's work, before giving them a drink. There should be a feeder for every two horses, and they should all be tied up, to ensure each animal having its fair share. Horses should be groomed before their collars were put on. In yoking up all the mane should be removed from under the collar, otherwise a lump would be formed, which would cause the collar to sit unevenly. Collars should fit well, rather too tight than too loose, for in the latter case they caused chafing. If collars were properly attended to, sore shoulders would very seldom occur. Horses should be fed regularly and given occasional changes of food. They should have a dry bed of straw and the stable should be cleaned out every day.

WEPOWIE, October 7th.—In a paper entitled "Odds and Ends," Mr. Jas. Orrock chronicled a number of small savings which might be effected on farms. Couplings, spiders, and whips could, he said, be made from green hide, which was far cheaper than leather and equally as serviceable. Kerosene tins were not only useful as buckets, but by cutting them from corner to corner across the top and bottom and then down the corners and fitting them in a wooden frame, a very cheap and useful fowl trough was provided. If the tins were opened right up and riveted together they made a good wall for a shed. In his blacksmith's shop, a farmer could make S and C hooks, split links, horseshoes, tongs and harrow tines. He could also mend hame hooks, old cultivator shares, when worn too small, could be shaped for the spring tooth and also for hoe tips on the drill. Mr. Orrock produced samples of green hide whips, couplings, &c., and odd blacksmithing jobs executed by himself.

WILLOWIE, August 7th.—Mr. E. J. Kentish read a paper on fallowing, and, after dealing with various makes of ploughs, he said that although experts agreed that deep working preserved the fertility of the soil, the general practice in dry districts was for light working, which he considered best, especially in lands rich in plant food and liable to blight. Early fallow worked up in the spring by harrow and cultvator gave the best results; it made a good seed bed. That was particularly the case in land which had not been cropped the previous year, and had been trodden by stock. Such land usually did not make a good seed bed unless it was worked up early. In the discussion which ensued, members agreed that shallow fallowing was the most satisfactory for that district, from 2in. to 3in. being the depth most favored. Opinion was divided as to whether the cast iron or steel share was preferable, but all favored the stump-jump plough.

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

BEETALOO VALLEY (Average annual rainfall, 18in. to 19in.).

September 11th.—Present: eight members and three visitors.

PROVISION FOR LEAN YEARS.—As a standby against drought Mr. P. Curtin, in a paper dealing with the provision for lean years, recommended that two years' hay should always be kept on hand, because, in a dry year, there was always an absence of feed or herbage in the paddocks, and consequently the stock would consume more fodder than in an ordinary year. Enough for one year should be stacked in the yard, and the balance built on high ground in the paddock. The stack should be well built, and out of the way of stock, only using it in case of necessity. The other stack should be composed of loose straw, raked up and all dirt well shaken out before carting. It should be fairly large, and placed on a sheltered, solid piece of ground, where stock could always have access to it. In the wet and cold of winter stock would benefit greatly from it, both in shelter and food. When the reaping had been done with a stripper all cocky chaff should be saved, carted into heaps to a spot convenient for feeding to stock, and covered with a good coating of straw. If fed with a little bran all stock would eat it readily and do fairly well on it. It would not pay to save the cocky chaff from the harvester, and it would be better to cut a little extra hay at hay time.

VALUE OF A FARM ORCHARD.—Mr. J. Flavel read a brief paper on the value of a farm orchard in which he contended that a farmer had not time to tend more than an acre of orchard. Mr. Jacobi considered that no farm was complete without a small garden of 50 trees, which would only require small attention, and would return a profit of £20 or £30.

BOOLEROO CENTRE (Average annual rainfall, 15.83in.).

August 11th.—Present: 13 members.

HORSE TRAINING.—In a paper on the principles of colt and horse training, Mr. W. H. Nottle said it was a mistake to punish a horse for not obeying certain commands or signals which it had never been taught. In training a horse impressions were being fixed on the animal's brain, and by constant repetition they became habits. If wrong impressions were repeated they became what were called bad habits. To the horse the habit was neither good nor bad, but the bad habit was simply a misunderstanding. When a horse shied the first time it was a mistake to punish it, because it then associated the pain caused by the whip with the object which had frightened it, and next time it shied it would be worse than at first. A horse kicked, in the first instance, in self defence, but when often repeated it became a bad habit, and the longer the habit had been permitted the more difficult it would be to overcome. Many bad habits were caused by severe jaw-breaking bits, which deadened the nerves of the mouth, and also by hitching the colt in shafts before it was ready for the lesson. Harsh words should never be used to a colt, and the words used should be such that the animal understood. When breaking the colt a yard 35ft. by 35ft. should be selected, and the animal's disposition should be studied. Every effort should be made to give it confidence. Two lessons should not be given the horse at once, nor two in one day. Dogs, fowls, pigs, and chickens should be kept out of sight whilst the colt was being trained. A 4-ft. pole should be used in poling the colt, and it should be allowed to feel the pole with its nose, which was the most sensitive part of its body. Old or weak harness should never be put on a colt. A four-wheeled gig should be used for colt training, and it should be broken to single harness before double. All habits in a horse were curable, except crib biting, and that was the outcome of a dental disorder.

CRYSTAL BROOK (Average annual rainfall, 15.62in.).

August 12th.—Present: 15 members.

POULTRY KEEPING ON FARMS AND IN PENS.—Discussing in a paper the relative merits of keeping poultry at large on a farm or in pens, Mr. J. H. Shearer expressed a preference in the first place for pure breeds as against the barndoor fowl, and he strongly favored the Silver Wyandottes, because they were hardy, matured quickly, and were fairly heavy birds, with a fine quality flesh. They were an ornament to the farmyard, were among the best winter layers, and the weight of

their eggs was very little below that of the White Leghorn. They were good brooders and, if not required for that purpose, could be easily put off, and would come on to lay again very quickly. Next to the Silver Wyandottes he favored the Rhode Island Reds, which were similar in habits and size, and were very beautiful birds. Regarding the relative merits of keeping fowls in the open and in pens, a competition termed the "no house test" for hens had been in progress since April 1st. Six breeders were competing with 12 birds each, six being housed in the ordinary way, and the other six being allowed to roost in trees. Despite several days' rain, and nearly a fortnight of frosts, every pen of the "no house" birds had laid more eggs than those in comfortable quarters. The total of the latter for two months was 322 against 689 laid by these subjected to the fresh air treatment. The leading pen in the "no house" test had laid 262 eggs and the nearest approach to that by a pen in a house was 213 eggs. In spite of the disposition of the White Leghorns to fly and to lay their eggs in out-of-the-way places, they would pay handsomely in scratching sheds, as recommended by Mr. D. F. Laurie, the Poultry Expert. A shed 100ft. by 16ft. divided into five compartments would carry 500 fowls on the scratching shed principle. White Leghorns crossed with Silver Wyandottes produced a nice plump bird, mostly white, with rose comb, which always added to its weight appearance, and made it a good market bird. One of the most important items in keeping poultry was to maintain a plentiful supply of clean water, which should be kept in a cool place, and never permitted to become stale.

MINTARO.

August 12th.—Present: 22 members and one visitor.

FARMING ON A TWO-YEARS SYSTEM.—In a paper supporting the two-years system of farming, as against the three-years system, Mr. P. C. Jacka said that he would consider a farm of 420 acres in that district too valuable to be farmed on the three-years system. It could be profitably operated by cropping 200 acres each year, taking 160 acres for wheat, 20 acres for oats, 10 acres for barley, and 10 acres for peas. Ten acres each of wheat and oats and the roads could be cut for hay, and the remainder harvested. After harvest anything from 40 to 80 acres should be burned off. The remainder he would burn off and fallow at the usual time. Then, if possible, he would cultivate it and sow various green fodders, such as fast-growing varieties of barley, namely, spring, Pryor, green-feed, or Cape or Algerian oats, provided that there was any takeall in the crop. When the fodder had come on sufficiently he would buy store sheep, fatten them, and quit them in September. Then he would plough in the fodder as a green manure. The cost of treating land in that way would not be heavy. About 30lbs. or 40lbs. of superphosphate and 1bush. of barley would suffice and would pay well for the work involved. That would pay better than allowing all the land to lay out as bare fallow, and a nice profit could be derived from side lines by feeding the surplus barley and peas to pigs and other stock.

CROPPING ONCE IN THREE YEARS.—In a farm of 500 acres, allowing 20 acres for a homestead, garden, and keep of cows, Mr. I. A. Jacobs, in a paper on cropping once in three years on a 500-acre farm, said that the balance should be divided into three paddocks of 160 acres each. That would give 160 acres of stubble, 160 acres of fallow, and 160 acres of wheat. The stubble land, as a pasture for sheep, would return more for the labor expended upon it than 160 acres of wheat. To make a just comparison between the two-years and three-years systems they should judge by results. The 160 acres of wheat, should, on the three-years basis, return 25bush. per acre, which would be 4,000bush. At 3s. per bushel that would be £600. From that amount there had to be deducted for seed, manure, and labor, 30s. per acre, which totalled £240, leaving a net balance of £360 as the return from the wheat crop. On the 160 acres of stubble and the feed on the fallow, 150 ewes could be kept, and they would rear 125 lambs. The ewes should yield in wool 8s., or £60 in all. For the lambs £100 would be received, and 25 sheep should be allowed the farmer each year for meat. The wool from the lambs would pay for the labor of attending to them. The total yield from crop and sheep would be £520, and it would be less labor to fallow 160 acres and tend the sheep than it would to fallow 240 acres and keep it clean. On the two years system there would be 240 acres of crop every other year. From such an area 15bush. would be a good crop. That would yield 3,600bush., which, at 3s. per bushel, would be £540. Deducting £360 (30s. per acre) for seed, manure, and

labor, the net return would be £180, leaving a balance of £340 in favor of the three years system. By cropping the smaller area and keeping sheep, less labor would be employed and the work would be more evenly distributed through the year. An allowance of 25 sheep for meat for the farmer had been made in the three years system, but in the shorter term the supplies would have to be purchased. Mr. Wright preferred ploughing the stubble in to burning it. Mr. Jacobs estimates were too high. Mr. Jacka said that 150 sheep on 160 acres of stubble was too much. Mr. A. Sandow found the two years system of farming most profitable, but agreed that sheep were a splendid asset on the farm. Mr. John Thomas said that the two years system on the red clay land had a tendency to make the land run together. Mr. E. A. Scarfe said that to justify the three years system it should be proved over a number of years.

NORTH BOOBOROWIE (Average annual rainfall, 16.35in.).

October 9th.—Present: 10 members.

ROMNEY MARSH SHEEP.—Discussing the Romney Marsh breed of sheep, Mr. F. E. Waddy, in an interesting paper, said that it was the only breed which thrived on the wet, cold, boggy land of the Romney Marsh in England. They were able to resist footrot and other diseases which boggy pastures tended to produce. There were many other characteristics in the breed which rendered it suitable for the production of fat lambs in that district.

PURE MERINOS.—Mr. A. V. Simpson read a paper advocating the use of pure Merinos for the fat lamb industry in that district.

SHEEP ON THE FARM.—It would pay to buy sheep at present, dear as they were, contended Mr. S. E. Mudge, in a paper on sheep on the farm, rather than wait until they were cheap. If at the present time a start were made with 50 ewes, the outlay would be £75. Two rams, one at £10 and one at £5 would bring the total investment to £90. With reasonable care 80 per cent. of lambs should be reared and they should realise at least £50 by next August. The wool next year, at 10s. per ewe, would mean another £25, or a total for the year of £75, leaving a debit of only £15 on the money invested, and against that there was the flock of sheep. If young ewes were bought, a flock could be obtained which would last three years at least, and they should rear in three years, 200 lambs. That was allowing for 80 per cent. droppings and five lambings in the three years, or seven months between each lambing. He recommended the use of two rams, in order that the lambings might take place as nearly as possible at the same time. The higher priced ram should be used for the first two or three weeks and then both for several weeks. Judgment would be required to decide how many sheep should be kept, but with 10 acres of lucerne, 50 ewes could be maintained. On the figures given, from 50 ewes £325 could be obtained in three years. He advocated using large framed, well woolled Merino ewes and the Leicester ram. By using the Merino ewe, perhaps a lower price would be realised for the lambs, but more for the wool, and much would be saved in fencing and worry. The Leicester was of special utility where hand feeding was resorted to. The animals grew and matured quickly, and a lamb four months old would weigh, when dressed, between 50lbs. and 60lbs. They had very small heads and were great foragers. Their wool was long and silky and a fair sheep would cut from 10lbs. to 12lbs., but they were not valuable as wool producers, their chief excellence being for raising fat lambs and mutton. Mr. H. A. Mayfield was averse to the use of the Merino alone for the production of fat lambs. In that district he had not been able to fatten a lamb under six months, whereas he could produce a Crossbred lamb weighing from 40lbs. to 45lbs. in 16 weeks. He preferred the Crossbred ewe for producing fat lambs, the Merino being unsuitable in flat country owing to its liability to footrot.

REDHILL (Average annual rainfall, 16.79in.).

September 14th.—Present: 11 members.

MIXED FARMING.—In a paper on this subject Mr. G. A. Button said that a farmer would not lose all his harvest by a visitation of frost, hot wind, rust, or other diseases which attacked a wheat crop if he carried on mixed farming properly. Mixed farming should be conducted on systematic lines with a definite object in view. Oats and barley should be grown as well as wheat, because they made good fodder when fed green or could be harvested and fed to stock to great advantage in winter time when green feed was scarce. More corn might profitably be used

for feed and then less hay would be required. Feed not needed when green could be put into ensilage. Enough stock ought to be raised to maintain the flocks. The majority of mares on a farm would do light work and rear a foal. Several paddocks should be provided for sheep in order to give them a change. It would pay to hand feed sheep when green feed was scarce. Sufficient pigs should be kept to supply the home with pork and bacon. Dairying also deserved to be considered, because cows, with fair treatment, would give a fair return. The most profitable line of all, considering the small amount of trouble involved, was poultry, whether reared for the market or egg production.

BOOLEROO CENTRE, September 15th.—Mr. G. R. Hein read a short paper on cows on the farm. In the first place he advocated the conservation of cocky chaff and straw in good seasons to be fed to cows in the bad seasons, at the rate of two double handsful of crushed oats to each animal. A few acres of oats should be grown each year; they yielded well and the straw could be stacked and saved to feed to the cows with an equal quantity of hay chaff. Even in the drought year, cows fed in that way produced enough butter for the homestead and some over for the market. He preferred the Jersey for butter purposes, but the offspring of a Shorthorn-Jersey cross would be a hardier animal and better for milk and beef. A farmer with 640 acres should be able to keep four cows all the year round. Cows turned out at night kept much cleaner than when stabled. In the discussion which followed, the opinion was expressed that, although the district was not a dairying one, it was essential to keep a few cows to supply the homestead with milk and butter and provide food for the rearing of calves and pigs.

BUNDALEER SPRINGS, September 13th.—Mr. S. H. Ellis read a paper on "Keeping Farm Accounts," in which he outlined a system which he considered could be adopted with profit, and he made the subject clear by illustrations on a blackboard.

CANOWIE BELT, October 2nd.—A paper on the care of farm horses was read by Mr. C. Davis. He urged that horses should be well stabled and fed, and that, when they were brought in from a spell, they should not be given a heavy day's work at once, but should be accustomed gradually to the full effort required of them. After working a couple of hours, a five minutes rest was very beneficial. An hour's feed should be given horses before going to work and they should have an hour and a half in the middle of the day. Kindly treatment for horses was essential. Discussion followed, in which the views of the writer of the paper were agreed with.

HILLTOWN, September 1st.—In a paper on beautifying the home, Mr. O. R. Dinham advocated a careful selection of the homestead site, and the building of the best homestead possible under the circumstances. Trees should be planted of such different varieties as to make an attractive appearance and in localities which would improve the scenery and afford shelter to the animals during the summer months. A wall with fancy iron work should be erected on the back and sides, and in front a stone wall about 15in. in height with pickets on top, and a suitable hedge planted inside. That would give a fine appearance and afford shelter to the growing plants in the garden. All waste materials lying about the outbuildings should be collected and stacked in a tidy heap. Good fences and gates also helped to make the homestead beautiful.

MOUNT BRYAN EAST, September 16th.—Mr. A. Doyle delivered an exhaustive address, illustrated by lantern slides, on the bulk handling of wheat. A long discussion followed. Mr. F. Thomas read a paper on "Colt Breaking" from the *Journal of Agriculture*, and considerable discussion followed.

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

JULIA (Average annual rainfall, 18in. to 19in.).

September 8th.—Present: 12 members and two visitors.

THATCHING HAYSTACKS.—Two papers on thatching haystacks—one by Mr. R. H. Cooper, of Riverton Branch, and the other by Mr. R. Bagster, of Salisbury

Branch—were read. Mr. R. H. Cooper declared that it would pay to put a good covering over the stacks as soon as possible after they had settled down, and the best covering and most effective in every respect was a good thatch. It was well to have sheaved straw of even size, which should be thrown off around the stacks, and there should be an abundance of sticks about 3ft. long—young wattles were very suitable, and held better than palings. They should be sharpened. It was necessary to have six sticks about 18in. long on which to wind binder twine; the number depended on the length of the roof. A small rake also was required. The straw needed to be wetted to make it set properly. A good plan was to have a trough to dip the sheaves in. If the stack was not very high, the sheaves could be tossed on to the stack to the left of the ladder. The ladder should be securely placed with an iron peg at the bottom. A row of sticks should be placed in the roof of the stack parallel with the ladder and sufficiently wide apart to take two rows of sheaves. The first two sheaves should be placed with the butts down in order that they should hang just over the eaves. The bands should not be cut. The remaining sheaves in each layer should be put with the heads down, lapping them half over and cutting the bands. Care should be taken to make the thatch as even as possible. When the layer had been completed, it should be raked down with the small rake. The raking and tying down should be continued as the operations proceeded, about every two or three feet. It improved the appearance to clip the bottom of the thatch with an old pair of shears. In thatching a shed, there was no body of straw to hold the pegs, and small galvanized wire was used instead of binder twine. An iron needle was required to pass the tying wire through the thatch, to be secured around the beams of the roof. Mr. Bagster, of Salisbury, in his paper, observed that straw was most generally used for thatching, though there was growing near the sea a wire grass which made a splendid thatch that would shed water as well as 3in. of straw. The straw should be sheaved and bound loosely, because it made in that way a better sheaf. Pegs should be 2ft. 6in. in length and cut from bamboos or palings. Suitable pegs could be made from artichokes, the rough stems of which made a good hold in the straw. If hay were held for more than one year, it was advisable to examine the roof to ascertain whether the ravages of mice, etc. had rendered it necessary to re-cover the stacks before another winter. In the remainder of the paper the writer emphasised the same points as the previous paper. Mr. A. Pfitzner considered that thatching entailed considerable labor. Some members considered that a good job could be made with the old system of putting loose straw on the stacks and holding same down with wires and netting with weights. Messrs. D. S. Heaslip and O. B. Pfitzner considered that square ends were most suitable for stack building. Mr. C. Nash preferred rounded ends because they were less liable to slip.

NORTHFIELD (Average annual rainfall, 19in.).

October 11th.—Present: nine members and one visitor.

SCRUB FARMING.—It was well to start with a plan, premised Mr. A. Berg, in a paper on scrub farming, and therefore it was necessary to place the homestead in the most suitable and convenient position and secure a good water supply. Having cut roadways for the roller and rolled down the scrub, preparations should be made for burning off by making fire breaks all round the portion which had been rolled. Usually the breaks were three chains wide. The best time to roll scrub was in September or October, because the wood had time to dry before the burning season. A day when a steady north wind was blowing should be selected for burning. It was essential to have a good burn, because it was waste of labor and seed to sow a badly burned ground. No more scrub should be rolled than could be properly kept under control, because if the fire broke into the standing timber, the cost of clearing that land could be safely estimated at 10s. per acre. Cutting two and three year old shoots did not pay, and land that had to be let go was worse than virgin land to deal with. A good stubble burn was a great labor saver, because it killed the shoots and reduced the work of slashing. The firerake was essential, because every possible means of scorching the shoots should be taken. Three good burnings would kill most of the stumps. For the first year a cultivator should be used, because it did not pull out many stumps, the proper time for that operation being when fallowing, for then they could be picked up and carted out of

the way. Mallee land should not be cropped three years in succession, because of the danger of takeall. For the first year 45lbs. of wheat and 50lbs. of super. to the acre should be sown and in the following year, the same quantity of wheat and 75lbs. of super. The land should not be worked deeper than 3in., but 2in. was deep enough after a good burn. The most suitable implement to use was the disc plough, because it did not gather rubbish and would run over sticks as well as cutting or dragging off many shoots. For a seed coverer, mallee branches (renewed twice a day) should be attached by fencing wire to the back of the drill. If a good burn off were not secured, it was better not to put a crop in, but to clear up the rubbish and put the land in fallow. There was no natural feed for stock in the mallee until after a fire, when spear grass grew in abundance.

RIVERTON (Average annual rainfall, 20.48in.).

July 10th.—Present: 24 members and 50 visitors.

GARDENING TO BEAUTIFY THE HOME.—In a paper entitled "Gardening with respect to the Beautifying of the Home," Mr. H. A. Davis contended that every home, whether in the town or on the farm, should have its garden plots, flower, vegetable, and fruit garden, and on the farm, tree plots. First, in regard to flowers, the enclosure around the home should be securely fenced with wire netting, pickets, or something that would keep out all farm animals. All gates should be self-closing. The beds should not be too large, 10ft. square well kept being much better than a large patch partly neglected. The beds should be well dug, mixing in as much well rotted manure as possible. The beds should be at least an inch or two below the paths. It would be necessary to remove some of the soil, but not the top soil, as he preferred to remove some of the subsoil, more especially if it were limestone or stiff clay. Before planting a border of, say, 4in. by 1in. jarrah should be placed around each bed. The paths should be filled with gravel, limestone rubble, or anything procurable, and rolled down nicely. For planting he preferred roses and shrubs, with say a shrub or palm centre, and a rose at each corner. The rest could be filled up with annuals in their season. The success or failure of a flower garden was in the laying of it out and the preparation of the soil. If that were not well done, there would be very little success. All weeds should be rigorously kept under by going round the garden at least once a week, and it would not take many minutes after the first year or two, if nothing was allowed to seed. Flowers, if allowed to seed became weeds, and gave a lot of trouble. Every home should have a kitchen garden. As soon as rain fell plants should be raised ready for planting out, such as cabbage, cauliflowers, turnips, lettuce, onions, &c., in small beds or boxes near the tanks, because they would need plenty of water. It was also as well to prepare a plot of ground for the next year by well manuring it and keeping it clean, which would save a lot of weeding. The land would be ready to plant at any time, and the manure would be well mixed in the soil, and give better results, besides paying well for the attention. Small plots of each variety should be planted and repeated every two or three weeks, so that they would not all come in at once. He advised sowing a good bed of rape, because it was an excellent vegetable. For a fruit garden, further than planting two or three trees of each variety, say, apple, plum, quince, lemon, and pear, he would not advise much in the fruit line. In that district fruit could be bought much more cheaply than grown. The only fruit grown to profit there were apples, quinces, figs, and lemons, especially the latter; two trees producing all that could be used. Tree plots on the farms were the most important of all. It had been a great mistake to remove all the great trees from most of the farm paddocks, and the sooner they were replaced the better. There should be two or three trees in every paddock and at the corners, but two to four trees standing out in the paddock, so that the stock could gather around them in very hot or rough, cold weather, would be a great advantage. On many farms there were stony patches, or land washed with creeks, which was of very little use, and it would pay to fence and plant some of them. It did not take a very large piece of land to hold 100 trees, and it did not take long to plant them. The greatest item was to fence securely, and sheep-proof any plots before planting. In the small plots in paddocks for shelter, he preferred the red gum before the sugar, as they grew more bushy, giving more shelter, and a better shade. If sugar gums were planted a pepper tree should be planted between, because they grew well, and made a splendid breakwind.

ROSENTHAL.

September 13th.—Present: 34 members and two visitors.

HARVESTER v. STRIPPER.—A paper was read by Mr. G. C. Heinjus for the purpose of demonstrating the many advantages of the harvester in comparison with the stripper. The most notable advantage was its labor saving propensities, and that fact should not be overlooked in the coming harvest, because, as was the case last harvest, men would not be plentiful. Some people contended that the harvester did not produce a good and clean sample, but that was not his experience. With a good team, and an even pace, he failed to see how it could be otherwise. Although he ran all his seed through the grader, there were many bags which did not produce a teacup of whiteheads and husks, and that in a 12bush. crop, was excellent. He had used three horses at times and they worked the harvester fairly comfortably, but that was because the ground was level and of a reddish nature. The cocky chaff, which was so much esteemed, was easily caught by placing a couple of old binder canvasses in position under the machine. The harvester did not crack the grain as most strippers did. Harvested grain was quite free from stones, gravel, and dirt, which found their way into the bags stripped by the ordinary machine. There was no wet or musty smelling wheat from the harvester. The harvester was so well constructed that there was very little wear considering the work it performed. He had harvested 800 acres and had not had a break of any kind. The machine did not waste the grain as the ordinary stripper and winnower did. The harvester pulled quite straight, which could not be said of all strippers. It could be started much earlier than the stripper.

SALISBURY (Average annual rainfall, 18.57in.).

September 5th.—Present: 12 members.

WOOL CLASSING.—Mr. Gordon S. Jenkins, in a paper dealing with that subject, said the object of wool classing was that when the wool was put upon the market the buyer might see that each lot was an even type of wool for which, knowing what he was buying, he would give top price. Before being placed on the classing table a fleece should be skirted, in order to make it uniform in length and quality. When thrown on the table the fleece should be pulled out flat, and skirting should be commenced behind the point of the shoulder and the sweaty edges removed with the fingers. After working in that way to the top knot and collar, the other side should be treated, back to the starting point and then around to the lower part of the breech, taking off the edge of the belly wool, which was usually left on the fleece. Then the tail should be treated, removing particularly all stained wool. After all the rough edges had been separated from the fleece the sides and ends should be folded over a few inches. Then the side farthest away from the classing table should be given a short fold. Then the fleece should be placed right over on the edge nearest the table and rolled from the breech to the shoulder, which would leave the best of the fleece—the shoulder—exposed. The staple should then be tested by holding it tightly in the thumb and forefinger of each hand, and clicking it with the second finger, to see whether it would break or not. For a small flock of 200 or 300 the tender wool should be placed with the short wool, but with a nice-sized flock it should be kept by itself. The AA, or first grade wool, should be the longest, brightest, and most attractive of the fleece wool, and light in condition. The A grade should include those shorter in staple, heavier in condition, and less attractive to the eye. The skirtings of the fleece should be made up into three lots, namely, (1) the longest and brightest of the skirtings; (2) the sweaty trimmings of the first pieces or any short-stapled pieces, and the stained wool (which should be dried before bagging or baling); (3) the table locks and floor locks, though in a big flock these might be kept separate. In big flocks of a few thousand sheep, the classes generally were as follows:—AA, fine, long and bright wools, light in condition; A, shorter in staple, heavier in condition, and therefore less attractive looking, and, if anything, a little finer; BB, long, bright and attractive, but more shafty and coarser in character; B shorter in staple than BB, heavier in condition, and less attractive; CC, very fine, heavy conditioned, fatty fleeces. For tender wools there might be many or few classes, according to the size of the flock and the class of wool grown. Crossbreds and long wools were classed on length and quality only, condition not being taken into consideration. The counts of crossbred and long wool ranged from 28 to 58, and for Merinos from 58 to 100. In a farmer's flock of 200 or 300, either Merino or Crossbred, it would only be necessary to make

two classes, the long, bright, and attractive fleeces being for AA grade, and the less attractive for A grade. No amateur should attempt to classify a big flock, because it was very easy to run one class into another where five or six grades were being made. It was necessary to remove all stains from the fleece and pieces, and keep the rolling table free from locks and second cuts. The floor should be kept clean, so that the skirtings should not be trodden upon, and the board should be swept after each sheep had been shorn. In answer to questions Mr. Jenkins said that it would pay to class the wool of farmers' flocks of 200 or 300 sheep, because it would mean an increase of 1d. or 1½d. per lb. He preferred blade-shearing unless the clippers were in good order and worked by a capable operator, otherwise wool was pulled out, and contusions were made.

TWO WELLS (Average annual rainfall, 16.31in.).

August 14th.—Present: eight members.

FENCING.—"Where sheep are kept it is advisable to put in five plain wires with one barbed wire on the top," observed Mr. L. A. Cordon in a paper on fencing. In erecting a fence, it was first necessary to obtain pegs for a line and then posts and strainers, and bore them with a §in. bit. The barbed wire should be laid out and strained and fastened to wooden posts. Iron posts should then be driven in. He recommended a fence with wooden posts 12yds. apart, with three T irons in between. When the barbed wire had been fixed the plain wires should be put in, commencing at the top. The top two wires should be No. 6 gauge and the others No. 8. Strainers should not be more than eight chains apart, because of the difficulty of keeping the wires tight in a long strain. The wooden posts should be 5ft. 6in. in length, and set 2ft. in the ground. Strainers should be at least 3ft. 6in. in the ground, and those at angles and at the end of the line should be strengthened with struts. Gum and mallee made the best posts, because, if solid, the white ants were less likely to attack them. Where sheep were not kept it was best not to have more wires than necessary, but where horses and cattle were kept there should be two barbed wires on top and one or two plain wires below them. In that case the wooden posts should be closer together, with two good strong iron posts between. All posts should be divested of bark before being put in the ground.

NANTAWARRA, September 14th.—Mr. A. F. Herbert read a paper in which he discussed the question whether it would pay a farmer to breed up a flock of sheep, and he arrived at the affirmative conclusion. He favored the Merino as a farmer's sheep, because it was quiet and was not severe on the fences. The Merinos gave a good clip of wool, produced a fair lamb, and yielded when killed as much mutton as Crossbreds. Mr. R. P. Uppill said that Merino sheep might be all right just now, but in ordinary times it was better to produce Crossbreds for market. More might be done in hand feeding than was done at present. For that purpose he preferred Crossbreds owing to their quiet nature; Merinos being timid did not do well. Graziers should be allowed to do the breeding for stocking, and it would pay the farmers to buy ewes from them rather than wait two years. One good lambing would supply the country again. He favored the Merino and Border Leicester cross mated with a short-woolled ram, because the progeny provided the best export lambs. Mr. P. Nottle preferred Crossbreds, and considered that more hand feeding should be done. Every farmer should breed a few sheep. It would take two years for the supply to come up to normal again. Mr. T. Dixon said that, even at present prices, it would not pay to breed Merinos on the farm. The Crossbred was the most profitable on small holdings. Hand feeding would be a great advantage at the beginning of winter.

NORTHFIELD, September 5th.—Mr. A. Sandercock read a paper on farming in the North, in which he discussed exhaustively the methods adopted in the districts of Hookina, Hawker, and Quorn in the North, Ports Germein, Pirie, Broughton, and Wakefield on the west side, Orroroo, Petersburg, and Mount Bryan on the east, with Balaklava, Mallala, and Riverton on the south. He dealt at length with the system of pickling wheat and sheep and pig farming.

STOCKPORT, October 6th.—Mr. K. Whitelaw opened a discussion on the question, "Can we cultivate, manure, and sow in one operation?" At present, he said, two machines, two teams, and two men were required to carry out work which, in his opinion, could be executed by one machine. By drilling in seed and manure they were wasting ground, because the seed and manure were in one row and

there was at least 7in. of ground to the next row with no seed between. When the seeds reached out they were to a certain extent, away from the manure, which was practically wasted. In sowing before the cultivator, the seed and manure would be more evenly distributed. If it were necessary to sow even 2bush. to the acre, that would not be too much, if evenly distributed. If they could only save one horse and a man something definite would be accomplished.

YORKE PENINSULA DISTRICT.

(TO BUTE.)

BRENTWOOD.

September 7th.—Present: 15 members and five visitors.

MIXED FARMING ON 1,000 ACRES.—Assuming that the holding of 1,000 acres was all arable land, Mr. H. L. Martin, in a paper dealing with mixed farming on that area, said that he would divide the land into 10 paddocks of 100 acres each, and fence with posts and six wires. Mixed farming could not be carried on satisfactorily with only some of the paddocks sheep proof. There should be, if possible, a water supply in each paddock, an arrangement which would be found of great value. Four of the 100 acre paddocks should be cropped each year, and three should be fallowed, leaving three for feed. In that way there would be three paddocks for wheat on fallowed land; one stubble paddock should be burned and cropped with oats and barley, say 50 acres of each. In an average season the oats could be cut for hay, and would be sufficient for the requirements of the farm. One stubble paddock should be burned and sown with Cape barley or some other suitable forage crop. Hay stubble should be sown with barley or oats, as generally it grew very little feed of itself. In regard to stock, from 250 to 300 sheep could be kept. Cows were also worthy of attention, where the family was sufficiently large to attend to them without hired assistance, but two or three should always be kept for household purposes. Pigs were a profitable side line, more especially where cows were kept and the family was large enough to attend to them. Poultry, if rightly managed, was one of the most profitable side lines of the farm. About 100 fowls would be sufficient, and would find most of their living for themselves about stack yards and stable. Every farmer should aim at breeding sufficient horses for his own use. Mr. F. Nation was averse to permitting poultry the run of the stables and haystacks, because they spoiled too much feed. They should be shut up and fed. Mr. Hagger said that the method outlined contained too many fences, which were expensive to construct and keep in repair. Mr. C. Boundy supported the small paddock suggestion, because stock did much better when changed about. Mr. Newbould advocated more barley and less wheat.

MINLATON (Average annual rainfall, 17.46in.).

September 8th.—Present: 12 members and two visitors.

DESTRUCTION OF RATS AND RABBITS.—In a paper dealing with a pest of rats and his method of destroying them and rabbits, Mr. A. D. McKenzie said that he had tried various poisons upon the rats, with no apparent effect. Large baits made from phosphate rabbit poison, sprinkled over with a little pollard and placed in tins, did not give any practical result. Subsequently, however, he dusted the bottoms of the tins with the pollard, broke the large baits into sizes little larger than a pill, dusted them over with the pollard, and used them. The result was very satisfactory, a large number of rats being destroyed. The few remaining had become very cunning. His experience was, that it was inadvisable to lay the poison for more than a couple of nights at a time. It should then be removed and fresh baits laid in a week or two. Baits for rabbits should be dropped into a garden hoe furrow, around the stump heaps or burrows. A little bran should be mixed with the pollard used for the baits. The baits should be renewed every few days. Members generally agreed that phosphate and pollard would keep rabbits in check if properly dealt with.

WESTERN DISTRICT.

CUMMINS.

September 16th.—Present: nine members and two visitors.

GRAZING IN CUMMINS DISTRICT.—The condition for growing grain crops in that district, remarked Mr. H. Hancock, in a paper on "Grazing in the Cummins District," had proved unsatisfactory, but it was suitable in many ways for grazing, and was a very healthy place for stock in spite of feed being scarce. The new land in that district usually grew a fair crop, but, after that the crops, owing to the lack of organic matter in the soil, were light. The best method to replace organic manure over a large acreage was to run stock—particularly sheep—upon it. It was necessary to grow the feed by cultivation. A crop could be grown with super., for preference a cereal which would develop readily and grow quickly again after having been eaten off, in that manner giving as much green feed as possible in a year. A paddock of 200 acres would keep many sheep in good order, there would not be the work and expense of harvesting and buying bags, and the sheep would return to the soil a large quantity of organic manure, and probably be as profitable as wheat off the same land. Even if there were a small loss, it would be more than equalised the following year because the land, treated in the same way, would grow double the feed and carry double the stock, which would return double the manure to the land and yield double the profits with the same cost of sowing. After that, the land would produce good crops of wheat, and that was where the profit would come in if it did happen that the sheep in themselves were unprofitable. In that district they had been cropping the land year after year, taking everything out and putting nothing in, with the result that the land was, if anything, worse than when they commenced. If they had run sheep on the land it would have been good after three years. Most farmers could treat 200 acres in the way he had indicated every year, and they would soon have 1,000 acres of good land. He recommended rye for grazing, because it came early and grew quickly after being eaten off. Besides that it kept shooting up green very late in the year if fed down, but it was of little use as feed if permitted to come out in head. Oats were cheaper to sow, but did not grow quickly, and stock did not like them until they came out in head, after which they were excellent food. Kale made excellent feed, and one sowing did for three years. Should it be intended to keep the land for grazing for a number of years, grass seeds should be sown with the crops, and in a year or two would be thick all over the land, providing feed without sowing. It should be a grass which would be green in summer, because that district, owing to the moisture remaining in the ground until the middle of summer, would be suitable for it. Mr. Blutcher agreed with the paper. He suggested oats as a good fodder. Mr. E. Slater said that barley was a better fodder than rye. Mr. J. Drudin preferred oats because of their hardiness, not being affected by the wet conditions of the district. Mr. R. Hamilton preferred oats to barley or rye.

PIG-RAISING.—Mr. W. P. Bartley read a paper on pig-raising, in which he advocated running pigs in a small paddock, and sty-feeding them at the last, because a better quality meat was produced. The sties should be in a well-drained position, and dry bedding should be provided when the weather was wet and cold. Pigs should be given a change of food, and plenty of exercise if they displayed symptoms of rheumatism. Milk and pollard made good food for growing pigs. Soaked oats made excellent food, and was cheap. All grain should be soaked in preference to being boiled. Jerusalem artichokes were fattening feed for pigs, which could be turned into the crop, except at such time as was necessary for the plant to re-establish its growth. Mr. W. Siviour was afraid that pig-raising in that district might be overdone because of the distance from market and the difficulty in transporting pigs to Adelaide in good condtiion.

ELBOW HILL (Average annual rainfall, 11in. to 12in.).

September 9th.—Present: 14 members.

COWS ON A FARM.—Regularity in feeding and milking were insisted upon by Mr. S. V. Wake, in a paper dealing with the keeping of cows on a farm, as two essentials for securing the greatest profit from the dairy herd. The cows should be fed whilst milking. A small paddock of wheat or barley, into which to turn the animals at night was most profitable. After milking in the morning they should be put

into the grazing paddocks. Where there were only three or four cows on a farm, separating was necessary only once a day. The evening's milk should be set in pans, skimmed in the morning, and then heated slightly before being run through the separator. The cream should be allowed to cool thoroughly before mixing with the cream from previous days. The two great drawbacks in that district were the absence of stud bulls and the distance from market, and in consequence the herds were deteriorating. Mr. A. C. Chilman considered that sheep, pigs, and poultry were more profitable on a farm than dairying. Mr. R. S. Mills said that cows, if well cared for, were the most profitable side line. Mr. G. F. Wake agreed with the views expressed in the paper. Mr. H. J. Wheeler insisted upon the importance of feeding, and it was essential that the cow should have as much water as she required whenever she wanted it.

GOODE (Average annual rainfall, 12in. to 13in.).

September 16th.—Present: eight members and one visitor.

EDUCATING FARM HORSES.—Papers dealing with this subject were contributed by Messrs. P. Hunt, H. Smith, and H. L. Will. Mr. Hunt advised bringing the colt quietly into a yard, and if necessary catching him by means of a crush pen. It should always be borne in mind that the station bred colt associated fear with human handling; consequently the first point was to allay that feeling. After the animal had been taught to guide, he should be fastened to a log of medium weight by means of two lengths of plough chain. If, on the signal being given, the animal failed to move, it should receive a smart cut from the whip. It should be stopped frequently and fondled, a little extra weight being added to the log. When the colt went quietly, it could be given a run between a couple of quiet horses. Work in the seed drill could then be given. The breaker should see that the animal was as quiet as possible before being put to work. Overworking and underfeeding were to be avoided. Mr. Smith advised breaking in a draught animal at from two years to two and a half years of age. A good plan of catching the beast was to run it into a stall together with another horse. After it had been handled, the winkers with a rein on either side, should be put on, and the colt run around, first one way then the other. After it had been made to draw a log, it could be put in the body of a wagon team, subsequently giving it a place in the shafts and then in the lead. Attempts to make the animal pull at the out-set would probably result in it becoming a jib. In regard to light horses, he said, they should not be broken in until they were at least three years old. Mouthing was of the utmost importance, and after that was carefully effected, the beast should be put into a trap with a quiet horse. Mr. H. L. Will advised handling the foal when it was young. After it was mouthed, it should be harnessed between two steady horses with good couplings, but not too long, and cross reins. Subsequently it could be put in between chains and hitched to a plough.

MILTALIE (Average annual rainfall, 14.55in.).

September 9th.—Present: nine members and two visitors.

WORKING BACK FALLOW.—Commencing with the declaration that working back fallow was a very important operation, Mr. H. J. T. Bagnell, in a paper on that subject, remarked that the harrows, which should be started as soon as the land became too hard for fallowing, should be of a good heavy type, and should be put across the ploughing. Stump picking should then receive attention, the land then being left until the middle of September or early October, at which time it should be worked back with an 11 or 12 furrow light skim plough. That one ploughing would be found quite sufficient, provided it was done when the ground was in good condition. Subsequently the spring tooth cultivator could be used; harrowing with a light implement across the ploughing should then follow. During the summer months the sheep should be allowed to run over the fallow occasionally and pick off all weeds which appeared, but they should not be allowed on the fallow while the ground was very wet, because it set too hard and the cultivation was greater. That land could be harrowed again after rain (not while wet, because of the tendency to set), but if done while the ground was damp it had a very beneficial effect at all times of the year. In fact, fallow could not be harrowed too often under those conditions. If more harrowing was done after summer rains, great benefit would be derived. Mr. T. J. P. McEachen did not see the necessity for so much harrowing. A set of harrows would soon be worn out if weighted. Dry harrowing was useless

except to kill weeds. Mr. J. P. Story considered that the harrows were not used sufficiently on most farms. Mr. E. Story said that one ploughing was enough for fallow with plenty of harrowing and cultivating to kill the weeds. It paid to harrow wet or dry. Mr. L. Aunger would only plough once, and, if a farmer had no cultivator, he could use the twin plough with the mouldboards off and give it a good cross harrowing. He would not work land likely to drift so much as stiff soils. Mr. H. R. Jacobs said, that light working fallow was the right thing generally, but it largely depended on the land and how it had been first ploughed. Land that he had ploughed when very wet had set so hard that it would be necessary to plough it again when more rain fell, because harrows would do very little good in its present state.

ROBERTS AND VERRAN.

September 12th.—Present: four members and one visitor.

BREAKING IN A COW.—In breaking in a cow, observed Mr. W. Whittaker, in a paper on that subject, it was advisable to secure the animal with a rope, caught over the horns by means of a slipknot, and have an attendant to hold the animal by that means close to the horns. The udder should be rubbed before and after milking, the latter operation being commenced gently, the pace being gradually increased. Mr. A. F. Cowley said that it was necessary to treat a young cow very gently, and it needed very careful milking. If either the front or back teats were milked more strongly than the other, they would always carry the most milk and the udder would not be well balanced. Mr. H. F. Imhoff said that a cow should be kept in milk as long as possible after her first calving, because if allowed to dry off too soon she would always be inclined to dry off about the same period. It was well to take the calf away from the cow as soon as possible after the cow had cleaned it, because the cow would then be less likely to fret about it.

YADNARIE (Average annual rainfall, 14.09in.).

August 12th.—Present: eight members and one visitor.

POULTRY.—In a paper devoted to a discussion of the merits of keeping poultry on a farm, Mr. A. Jericho expressed the opinion that the barndoor fowl was the best adapted to the farm. It was well to exchange eggs for setting, in order to avoid in-breeding. Incubators required the expenditure of too much time and labor to be profitable on a farm. Hens should be sold or eaten after their third laying season, except 25 or 30, which should be kept for setting. They should be set whenever they became broody, in order to have pullets commencing to lay all the year round. A fowl shed fairly large should be provided, with a yard attached. The shed should be built of galvanized iron, broom bush, or stumps. The yard should be enclosed with 6ft. wire netting on the sides and on top to prevent the crows getting to the nests and to keep out the foxes. Great precautions should be taken against tick, which it was almost impossible to eradicate when once established. Mr. W. L. Brown considered poultry a profitable side line. Mr. A. Spriggs was of opinion that fowls did best on limestone country. Mr. F. W. Dreckow recommended crossing common fowls with pure breeds from time to time. That was the secret of egg production. Pure breeds were not so hardy as the cross. The Chairman said that poultry must be housed, if kept for profit. Mr. G. A. Dreckow found common weevil wash most effective in treating tick.

BUTLER, September 11th.—A short discussion on the question of fallowing took place, the prevailing opinion being in favor of early fallowing.

COORABIE, September 9th.—A paper on the bulk handling of wheat, more particularly as it affected that district, was read by Mr. H. V. Hobbs. He dealt exhaustively and impartially with the subject from every point of view. A protracted and animated discussion followed.

KOPPIO, September 12th.—Mr. W. R. Richardson delivered an address on his travels and observations in the Eastern States.

KOPPIO, October 10th.—A meeting was held by invitation at the homestead of Messrs. Richardson Bros. and an inspection was made of the sheep, crops, and horses, which were in excellent condition.

MOUNT HOPE, September 15th.—Mr. R. L. Myers read a paper, in which he discussed the rural outlook.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

LAMEROO (Average annual rainfall, 16.55in.).

August 12th.—Present: 14 members and three visitors.

LUCERNE GROWING.—For lucerne growing, remarked Mr. W. Neville, of the Wilkawatt Branch, in a paper on that subject, a good piece of sand land, either white or red, of a fair depth, say, from 6in. for 1ft., should be selected. It should have a gentle slope to ensure good drainage. The reason for selecting sand was that magnesia, &c., which existed in the water, drained away through it, but where heavy land was irrigated it would soon be clogged with magnesia, and the lucerne would gradually die out. In July the land should be ploughed as deeply as convenient with a good quantity of stable manure, and worked until the end of September. Then 1cwt. or 2cwts. of super. or bonedust per acre should be drilled in, and on a fine seed bed 10lbs. to 12lbs. of seed per acre should be broadcasted. It was advisable to divide the seed into two lots, mixed with sand, in order to give a greater bulk, and apply in two operations, one lot each way, in order to secure a more even sowing. The seed should be covered either with light draught harrows or a bough, which would answer the purpose equally well. Then it should be watered and the watering should be repeated every few days if the surface were becoming too dry. When the lucerne had attained a height of 6in. it should be cut and allowed to lie where cut to protect young growth and surface roots from heat. After cutting it should be well soaked, and then a good stand would be secured. Exceptional cuts must not be expected the first season, but succeeding years would fully repay the first year's efforts in establishing the plot. Every time a cut was taken it was wise to give a top dressing of stable, or, better still, fowl manure. The proper time to cut lucerne was when the young shoots appeared to be ¼in. to ½in. in length. If cut before that the plant would be weakened. When the plot had been established a couple of years it would be beneficial to root it up somewhat in the spring time with weighted harrows, tine cultivator, or disc harrows, and work in bonedust or lime. Mr. A. J. A. Koch said that the slope in the plot should be very small. From 30 to 40 tons of stable manure per acre was not too much. Hunter River seed was the best, because it grew well in winter. Mr. S. R. Sinclair said that it took one mill all its time to keep a small patch of lucerne going. Mr. E. T. Wray said it took more water than could be had to keep a small lucerne patch going. Where 200 or 300 sheep were kept, besides other stock, one bore was not sufficient.

USE AND ABUSE OF MACHINERY.—Mr. W. J. Taylor, of the Wilkawatt Branch, read a paper on the use and abuse of machinery. He said that, with the increasing prices for machinery, it was necessary to consider whether the best use was being got out of the machines. Manufacturers could assist in prolonging the life of their machines by making improvements to suit the conditions of the country. A farmer should take as much pride in his machinery as he did in his stock, and that would go a long way towards getting the best use out of it. In purchasing machines regard should always be had to future plans, developments, and requirements, and then it would not be so continually found that machines were growing useless. Engines especially should be purchased several horsepower beyond the extent to which it was intended to use them. Proper lubrication was another essential, and for that purpose different classes of oil should be used, thin oil being applied to a fast travelling bearing and thick oil for a slow motion. There should be sufficient lubricator cups to ensure a good flow of oil to the revolving parts. He strongly recommended the patent force-feed lubricators. All machinery should be placed in thorough repair long before it was required for use. Every farmer should do his own repairing, and for that purpose there should be a blacksmith's shop on every farm. Mr. F. W. Eime urged the necessity for providing sheds for farming machinery. Stumps and sand shortened the life of harvesters in that district. Mr. A. J. A. Koch recommended the use of the common oil feeder, because it was a great oil saver. Heavy oils should be used in summer and thin oils in winter.

MONARTO SOUTH (Average annual rainfall, 14in. to 15in.).

October 7th.—Present: 20 members and three visitors.

SINKING A DAM.—Mr. H. Frahm outlined his method of sinking a dam. Having selected a good catchment, it was necessary, he said, to ascertain whether the

subsoil would hold water. That could be accomplished by sinking a small hole to the required depth and filling it with water. For sinking, he preferred a single furrow plough and a four horse automatic scoop. A long narrow dam was better than a square one. In commencing work, all surface ground should be removed well back, so that the embankment might be formed of the subsoil, good water holding clay, and it should be well bound with the sides of the dam. If the surface ground were not removed from the embankment it would be useless. The dam should be fenced to keep out great cattle, but sheep might be allowed in, because they improved the embankment by packing it. In the discussion which took place, Mr. Frahm's scheme was endorsed.

ENGINES ON THE FARM.—In a paper dealing with engines on a farm, Mr. H. Hein said that he favored the oil engine, where a large amount of work was required in the cutting of chaff, crushing, &c., and the engine had to be worked continuously. That did not become nearly so hot as the petrol engines, which were far more complicated and required much more attention. However, in that district, a 6-h.p. petrol engine and a No. 3 chaffcutter would be best. The engine should be in a space separated from the chaffcutter, because of the dust arising. Discussion followed, in which preference was expressed for the petrol engine because it could be so quickly started.

MURRAY BRIDGE.

September 11th.—Present: 23 members.

VEGETABLE GROWING ON SWAMP LANDS.—In a paper dealing with vegetable growing on the reclaimed swamp lands of the Murray, Messrs. J. Fletcher and A. R. Hilton wrote:—The reclaimed lands on the Murray offer opportunities for vegetable growing unequalled in South Australia. Abundant water is available, and the land is of the richest character, yet the vegetables needed for the district come largely from Adelaide, and in many cases owners of suitable land do not even grow sufficient for their own use. In the Murray Valley much more time and importance should be attached to the vegetable garden. To those whose work is of a trying nature, or such as to keep them indoors, there is no equal to it as a recreation. Before going into the actual growing of vegetables the question of the soil for the garden must be touched on lightly. It is useless to expect good results unless the soil is in good heart. If there be a good loam with a clay subsoil, so much the better, but a poor soil can be got into good order and made fertile. In the case of swamp lands—and it is to those this paper particularly refers—in choosing a garden it should be on the higher part usually found near the river, and not so liable to flooding as the lower areas. The land should be either trenched or the ordinary plough used, followed by a subsoil plough, care being taken that the subsoil is not brought to the surface. Rolling and harrowing should then be practised to bring the soil to a fine state. Many vegetables, especially the root crops, respond wonderfully to a deeply-worked soil. In fact, without this deep working, they are usually forked and of poor size. When the land has been well worked, great care should be taken to kill the weeds. Weeds cause the loss of an enormous amount of all crops, in fact, one writer says that 50 per cent. of the possible yield is not secured owing to the loss caused by weeds. Not only do weeds take up the space required by the crops, but they rob them of water, food, light, and air, and hinder cultivation. Many weeds are in alliance with the insect and fungus pests, e.g., charlock, acts as host to the turnip fly, and the fungus disease causing club foot in cabbage. When the land is cleared of weeds the various pests are far less troublesome. When vegetable gardening has been practised on the swamp lands the weeds have proved a big problem, because, after flooding, the weeds seem to grow by magic. The land, therefore, should be irrigated some weeks before planting to give sufficient time to start the weeds into growth. By then turning them in, a clean seed bed may be assured for the coming crops. Great care should be exercised in the choice of seed. Nearly all seed rapidly deteriorates with age, and a simple experiment should be made where valuable crops are to be planted, to ensure that a high percentage of the seed will germinate. If 100 sample seeds are placed on a damp flannel and kept in a warm place, it can be readily seen what percentage will germinate. The land being ready, consideration must be given to the question of what are the crops most suitable. The subject may be considered under the heads of green crops, root crops, and pod bearers. Of green crops there are the following:—The cabbage family, including cauliflower, kale, and broccoli; celery,

lettuce, all kinds of marrows, rhubarb, and strawberry, silver beet, and tomatoes. Root crops include potatoes, carrots, parsnips, turnips, swedes, onions, red beet, artichoke, and sweet potato. Legumes include peas and beans, embracing French and broad beans. Some of these crops seem particularly suited to local conditions, while others are not altogether successful, or, at least, not in the seasons so far as present observations go. The cabbage family, for instance, though it grows strongly, is subject to attack by cabbage aphis and cabbage moth, which, in a few days, render a fine bed an unsightly mass. But these seem worse in dry seasons, and a more suitable system of watering might make a difference. Hence heavy planting of cabbages or the cabbage family is not advocated. Lettuce does particularly well, so also does silver beet and rhubarb, which should pay well to cultivate extensively. If a good variety of rhubarb, such as Tapp's Winter and Victoria Giant were grown it should produce splendid crops. The plants should be planted a yard apart in land liberally treated with stable manure, as they are gross feeders. The stems should be pulled off, but sufficient left to keep the plant healthy, and they should never be allowed to seed. The roots may be obtained or seed easily raised in spring and planted out the next winter. Rhubarb is very little troubled by disease or pests. Celery will do well in rich swamp soil, but should never be allowed to become dry, or the plant becomes stringy. It is easily raised from seed in spring, and should be planted four feet apart in trenches 18in. deep and a foot wide. As the plants grow, fill in the trenches, taking care to prevent the soil getting into the heart of the plant. Celery responds readily to liquid manure, is little troubled by pests, and the salad white is a good variety to plant. A strawberry bed should be on every holding as strawberries make wonderful growth, and may be found in bearing from October to March. Mr. Quinn, in January last, remarked on the splendid plants he saw in the swamps. There should be a great future for strawberries in the Murray Bridge district. The greatest drawback is the question of labor, as they must be kept clean, and the runners prevented from rooting. If the plants are set out in the early autumn, while the soil is still warm, they get a good hold before the winter sets in. The soil round strawberries should never be deeply dug, but should be hoed lightly. Strawberries are at their best in their second year, and should be dug under after the third year, and each year a new bed should be planted out. The tomato is a plant particularly suited for the Murray swamp lands, and very fine crops may be assured. On acount of the possibility of a late frost it is not suited for early crops, but gives good results for main and late crops. Seeing that satisfactory prices are given for tomatoes, even for sauce making, they should be more cultivated locally than they are at present. Tomatoes should be raised in a hot bed or sheltered place, and hardened off before being planted out. For early crops, sow seed in July, for late crops, in October. When planting out, choose a cool day, and plant in rows six feet apart, with five feet between each plant. Plant in the afternoon, and give each plant a pint of water. Afterwards do not flood, but run the water down in channels between the rows. No manure is required on the swamps, and too liberal manure anywhere should be avoided, or the plants will run to rank foliage, and crop very late. Four weeks after planting run a cultivator between the rows, and hoe round the plants, to keep the ground loose and moist. When the vines begin fruiting, hill the plants with a small plough; this will prevent the winds blowing the plants about, helps to raise the fruit from the ground, and prevents the water lying around the stems. For early planting where frosts may be expected, cut kerosine tins cornerwise into two pieces, turn the open side towards the north-east, and, if available, shelter with a piece of glass. It is also important that breakwinds should be placed where winds are strong. Where practicable, and especially in small gardens, the bushes should be trained to stakes, and by a system of pruning better and earlier fruit may be obtained. As the young plant grows, the leader is tied to a stake, and all side shoots are pinched out of the axils of the leaves, but often the first three shoots formed are allowed to remain. In connection with the pruning, it will be noted that the flowering stems arise from the stem on the opposite side to a leaf. Like the grape vines, the fruit-bearing growth of the tomato is devoid of leaf growth. In training to a single stem, all side shoots are pinched out, and the main stem encouraged to ascend until three or four good fruit clusters are formed. The terminal bud is then pinched out of the leader, and the sap thrown down into the fruit clusters. Over watering is to be avoided, and the best guide is to be found in the growth of the plant. If this be continuous,

but not rank, they are doing very well. Very vigorous growth is not suitable for setting fruit. After a good setting of fruit, watering may again be resorted to. Some good varieties for the district are the Market Favorite, which is probably the most abundant bearer, and is an early tomato. For late crops the Mikado and Pondisona give large fruit of excellent flavor. In the Hawkesbury district of New South Wales £60 per acre is regularly made by tomato growing. Melons, including trombones, marrows, watermelons, and pumpkins, are very suitable for the district, as they thrive in the hot sun, rich soil, and moist conditions of the swamp areas. The great thing is to so work the land that the weeds may be killed before planting. Plant in rows, 30ft. apart, about October. In small gardens, where space is limited, some of the varieties of bush marrow, which mature very early and bear good crops might be tried. On high lands an old hot bed is an ideal spot for trombones. There, too, the cucumber family may be included. Trombone family make a splendid vegetable food, and may be stored to keep all the winter. A fine variety for winter use is the Hubbard Squash. Nearly all the root crops do well on the reclaimed lands, *e.g.*, red beet, parsnips, carrot, turnip, and swede, and are not much subject to disease and pests. It may be noted that they need a deep soil, and a fine surface tilth; where the land becomes hard or cracked they will not be a success. Planting in rows and thinning out are recommended; the weeds then can be kept under. Two plants worth trying are the artichoke and sweet potato, especially the latter, which grows to an enormous size, and makes a very pleasant change from the ordinary potato. As a root crop, the onion deserves special mention. It can be recommended as being free from many pests, and in this district a crop of 30 tons to the acre has been grown. As with other crops, the land cannot be too well worked. It would be necessary here to raise seedlings and plant out, as by planting seed the weeds would grow much faster and choke them. The seed for an early crop should be sown in April, and for a late crop in June. Plant out in cool, moist weather, avoiding winds. The quantity of seed to be used per acre is about 2½lbs. Onions, unlike other crops, may be grown on the same lands for years without manuring, and a series of experiments gave the highest yield to those plots where the land had been left in its normal state. Onions should be planted in rows 10in. apart, the plants to be a distance of 5in. from each other. This allows room for a double hoe to work, which will be found a valuable implement for this crop. While the onions are growing the land must be kept free from weeds, as the foliage of the plant is of such a nature that it cannot choke the weeds as the potato does, and probably the greatest objection to growing this crop in large quantities will be the difficulty in keeping the crop clean. Much depends on cleaning the land before sowing. Suitable kinds for growing in early crops are Early Globe and White Spanish, and for main crops and best keeping onion the Brown Globe is difficult to beat. Potato growing on swamp lands presents certain difficulties, which must be experienced to be appreciated. The chief difficulty here will be to properly regulate the water supply, as to flood a potato crop at certain stages means to court disaster; in fact, to grow good eating and keeping potatoes, a well-drained soil is a necessity. One of the most important things in potato growing is to change the seed every two or three years, and to change the position in which they are planted. Procure fresh seed from a cooler district than that in which they are to be grown. Good sound seed should be procured some time before they are required for planting, and they should be spread out under the shade of trees and turned over from time to time, as in that way strong, healthy shoots are developed. For early potatoes a northerly aspect is the best, as they will stand a fair amount of frost, so long as it has time to thaw before the sun gets on to the tubers. Early planting would be too risky on the swamps, though many of the slopes above the river would probably grow splendid potatoes if they were irrigated. An authority considers that those sandy slopes are ideal places for potato growing. Where the seed is not more than two inches in diameter it should be planted whole, and in cutting care should be taken to see that there are two good eyes in each set. Kinds that have been successful on the swamps are Redskins, Manistee, and Snowflakes for late planting. Under suitable conditions, good results should be obtained. At Monteith 10 tons were removed from half an acre. When planting, the land should be watered a week beforehand if dry. The rows should be three feet apart, thus giving ample room for banking, and hindering the ravages of the wire worm. Much judgment is required in watering potatoes. On peaty and well-drained soil it is a simple mat-

ter, but, on the harder black soil around Murray Bridge it would be advisable to have furrows 30ft. apart, and when watering these should not be allowed to overflow, or water to appear on the surface. After watering care should be taken that the land drains readily. On the other hand, the soil should be kept moist, or after watering the potatoes will start to grow again, and instead of a good sample the tubers will be knotty. Irrigation should not be resorted to after the blossoms appear on the plant. In planting, a convenient method is to use a double-furrowed plough, which will give a distance of three feet between the rows, and plant four or five inches deep, harrow lightly when the potatoes appear, and bank up with a potato digger when six or eight inches high. The time to sow Redskins or Manistee is October, then dig in December, and plant Snowflakes. In some cases potatoes have not been satisfactory on the swamps, and it has been suggested that a good dressing with lime, about one ton to the acre, would have a beneficial result, both in regard to reducing the acidity of the soil, rendering the top soil more friable, and in driving away wire worms. Where these are bad, dig the crop early, or the tubers will be attacked. Pod bearers, or legumes, give good results on the reclaimed lands. Broad beans and Yorkshire Hero peas grow very heavy crops. They are extremely easy to grow, and, given a good start, will outgrow and choke the weeds. As they grow very strongly, set in rows three feet apart, and they will then overlap. Once they are well started, the moisture in the soil is sufficient without irrigation. For early crop, the Early Sunrise is to be recommended, though it is not equal in flavor to the Yorkshire Hero. Whatever crops are grown, it will pay to consider the matter of their rotation. Do not grow green crops, for example, in the same plot year after year. Arrange a succession of green crops, root crops, and pod bearers, and remember that the latter improve the soil by adding nitrogen to it. Rotation also helps to overcome the pest trouble. Thorough cultivation is essential, and very much less watering need be done by keeping the top soil in a state of fine tilth. Killing the weeds will go far to assist the crops and keep down pests which live among and on the weeds. At present the swamp lands need little manure, but as heavy crops are removed it will probably require feeding. The present system of watering the land by flooding is not a good one for vegetable growing, and if any one could arrange a system of sprinklers, very fine results would be obtained. The swamp lands would probably be greatly benefited by a good dressing of lime.

RENMARK (Average annual rainfall, 10.93in.).

August 10th.—Present: 15 members and two visitors.

GENERAL MANAGEMENT OF A TEN-ACRE BLOCK.—Dividing the subject into four parts, namely, cultivation, harvesting, pruning, and general, Mr. T. Hooper, in a paper on the general management of a 10-acre block, proceeded under the first head to say that cultivation was the most important consideration. The land should be ploughed to a depth of 5in. in late winter, and the lands thrown out from the centre before ploughing back. The harrow should follow the plough as soon as possible to break up lumps and give a general levelling down before the first irrigation. After irrigating the land should be well worked with the disc, or, for preference, ploughed back to the vines. That killed the weeds, which were generally most troublesome in the early spring. He strongly advocated a second ploughing, which tended to keep the soil fairly level. After succeeding irrigations the disc cultivator and harrows would keep the land in good condition. Hoeing should follow horse cultivation. By hoeing he meant thorough hoeing, breaking up all the land which the implements had missed, whether there were weeds or not. That was specially required with young stuff of all kinds after every irrigation. If that were more thoroughly attended to there would not be the necessity for so much replanting year after year. In regard to harvesting, the keynote was method. Too much money was spent in labor at that time of the year. Last season he harvested 7 tons of fruit which cost him in wages a trifle over £12. With the assistance of one man he did all the work. He had no rack, and all his drying was done on 3ft. by 2ft. wooden trays. Slightly over 4 tons of sultanas were all three crown, and most of his lexias five crown. In pruning different blocks required different treatment, according to the strength of the vines and the quality of the land. Every vine should be treated on its merits. He wished to say that the theory that the rod on sultanas from old wood did not bear fruit was wrong, because his experience had been that it did bear fruit. He preferred

pruning in July. Lastly, there were a few things he wished to point out, and the first was that a 10 acre block required the same number of implements as a larger property, and in most cases two horses were necessary. The small man, therefore, labored under many difficulties. He was a great believer in gypsum, which spelled success to the man on the heavier soil. "Thoroughness" should be the watchword of the blocker, and he should always finish one job before commencing another.

ROSY PINE.

September 13th.—Present: 14 members.

KEEPING FARM ACCOUNTS.—For the "double entry" system of bookkeeping, observed Mr. F. G. Bonnin, in a paper on keeping farm accounts, two books were required, a journal or day book, and a ledger. A separate cash book might be kept if desired, but was not essential. The day book contained a record of all moneys received and spent, and it indicated to which accounts they should be subsequently entered in the ledger. The day book required to be kept up to date at all times, otherwise mistakes and omissions would occur and render the work practically useless. The ledger could be posted up at any time. All cheques drawn should be entered in the day book. The ledger contained a person's own private account, and also an account for each of the persons or firms with whom he did business or had dealings. In the ledger, for every credit shown on one side, there required to be a corresponding debit in some other account. If that system were carefully followed, the books would be correct, and the accounts would balance. The farmer's private accounts, which would be all debtor accounts, should show all disbursements of money on the farm, grouped under different headings, which should be divided up and named to suit individual requirements. The "house account," for instance, which included all living expenses, should, at a glance, show how much had been spent on the housekeeping. All the storekeepers' accounts for food, &c., would be grouped in that account. There should also be a "wages account," which would record all payments made for wages, and the names of the persons to whom the payments were made. There should also be accounts for "plant," "stock," "seeding," "harvest," "freight," "fodder," &c., each showing the various items of expenditure under their own particular heading. The number of those accounts could be increased to suit different needs, but the greater the number of accounts the heavier the work, and it was therefore an advantage to make the number of accounts as few as possible, consistent with the usefulness of the work. Besides the two books, day book and ledger, a diary might be kept in which should be entered what the various men employed on the farm were doing each day, in order that the exact cost of any particular work might be obtained if required. At seeding time the number of acres drilled each day should be recorded, also the quantity and variety of seed sown, and the quantity of super. per acre. At harvest time, a careful record should be made of all the bags of grain, the number of bags in each wagon load, the weight and to whom delivered, and note should also be made of the yield of each particular crop and paddock. The date on which each man commenced and finished working and his rate of pay should be recorded. The history of each paddock cropped should also be put down in a note book for that purpose. Lists should also be kept of all stock on the farm, the dates on which there were increases or decreases, also the dates when the female stock were mated and the date when the young were dropped.

ROSY PINE.

October 11th.—Present: 10 members and one visitor.

CARE OF HARNESS AND IMPLEMENTS.—Too much care could not be taken of harness and machinery on a farm, declared Mr. M. A. McCabe in a paper dealing with that subject. Harness should not be allowed to lie on the ground, but be kept in a specially built shed. At least three times a year it should be oiled, and the farmer was advised to keep on hand needles, hemp, wax, and bifurcated rivets to effect repairs. Due protection from the weather should be afforded all machinery, and attention should be given to all bolts and oil to bearings, particular notice being given to the cleaning of oil holes. Messrs. W. Schiller, W. Pannell, and A. Sands discussed the paper.

SHERLOCK (Average annual rainfall, 14in. to 15in.).

September 23rd.—Present: seven members and one visitor.

MIXED FARMING.—In a paper treating of the advantages of mixed farming, Mr. J. P. Trezona advocated the division of the farm into three parts, which should be used in rotation for oats, fallow, and wheat. The wheat crop was much more prolific after oats, and there was less liability to the ravages of takeall. Sheep on the farm provided a large revenue, but, in the absence of suitable fences, sheep were better left alone, in which case attention should be paid to dairying, pigs, and poultry. He believed in keeping pure breeds of cows, and preferred the Jersey. During the drought they maintained their condition, and their milk was better than the crossbreeds. He chose the Jersey for cream, because, in that district, there was no market for milk. With pigs it was necessary to choose a suitable breed, and he recommended a Berkshire boar mated with a Middle York sow, because the progeny fattened more quickly on less feed and attained heavier weights than other breeds. For poultry, screenings provided feed at practically no cost. For egg production, White Leghorns were best, but the White Leghorn hen mated with a Wyandotte rooster produced an ideal farm bird. The best table birds were the product of a Malay rooster and a Black Orpington hen. They were very hardy and the hens made splendid mothers. Turkeys, geese, and ducks should also be kept. A foal or two should be raised each year to replace losses by death.

WYNARKA.

August 12th.—Present: 10 members and two visitors.

SHEEP CARRYING CAPACITY OF A FARM.—Under this title Mr. T. Yeates read a paper, in which he reviewed the improvement which the use of fertilisers had worked in the sheep-carrying capacity of farms. After discussing the evils of overstocking and understocking, he emphasised the necessity for those who sought to raise fat lambs growing catch crops, in order to provide green feed for the ewes at lambing time. Some of the best crops to grow were barley, mustard, oats, and early wheat. Though in a dry season such crops might fail, it was also to be remembered that in such a season the natural herbage would also be wanting. Other means would then have to be adopted. Chaffed straw and molasses, which involved little labor, provided a fair substitute, but was hardly sufficient to raise early lambs, and something better would have to be provided. He recommended 1lb. per day each of crushed barley and crushed oats, or half a pound of each and 1lb. of bran, which would keep the ewes in good condition, and cost only one penny per day, or say 2s. per ewe for the three or four weeks for which it would be required. That outlay was justifiable with fat lambs realising 20s. to 30s. each. Until farmers had more experience in growing catch fodder crops they should go slow in regard to increasing their flocks, and therefore the selection of the right number of sheep to carry—the happy medium between too many and too few—would have to be left to each farmer to work out for himself. Mr. Schultz said that the best use could not be made of the land until sheep were kept on the farm. Mr. Packham said that sheep were better than harrows for consolidating land when in moist condition. Mr. Boyce advocated growing one or two hundred acres of oats for feed, but considered that the district was better adapted to raising fat lambs than wool.

BORRIKA, August 12th.—Mr. R. L. Penfold read a paper on co-operative purchasing and selling, in which he referred to the profits made by the middleman, especially in relation to the sale of super. and the handling of the wheat harvest.

CLANFIELD, September.—In a paper treating of economy of time on the farm, Mr. E. Daws pointed out that a large amount of time would be saved on a farm if the homestead were properly planned in the first instance. The stable and hay and chaff sheds should be under the same roof, with the stack close enough to permit of the hay being pitched almost directly into the shed instead of being situated 200 or 300 yards away, necessitating the use of a dray or lorry. The erection of gates, instead of the provision of three or four loose wires, would save more time in the first half-dozen occasions on which the gate was used than was taken in erecting them. At a previous meeting, after setting out the advantages to be derived from fallowing, Mr. J. Cockshell, in a paper on that subject, remarked that fallowing should succeed seeding as quickly as possible by ploughing the heavy soils when not

too wet nor too dry, and continuing on the lighter soils when it was not wise to plough the heavier ones. He preferred disc ploughs, because they turned the ground well, cut a large percentage of shoots, and would go through more straw and rubbish than a share implement, and there was no risk of the implement being hooked under firm stumps, which always jarred the shoulders of the horses. A 10-disc plough, drawn by nine medium draught horses, formed a good fallowing turnout, and it was possible, by feeding the team well, to average 60 acres per week on land which had not too many big shoots. A fortnight after ploughing the ground should be harrowed. In the spring time it should be cultivated to keep the weeds from seeding. There was the trouble of fallow on the sandridges drifting, but if half a chain along the tops of the ridges were left to grow mallee a large proportion of the drift would be prevented. The consensus of opinion in the discussion of the paper was that farmers must fallow more extensively, and that the best implement for the operation was the disc plough. Mr. Wilkins recommended cutting shoots immediately after fallowing.

KINGSTON-ON-MURRAY, September 25th.—Mr. Bransome, a visitor from Two Bays Nurseries, Victoria, delivered a lecture on pruning and fruitgrowing, dealing mostly with the sultana. He described the methods adopted in Mildura, and stated that from 2 to 2½ tons of dried fruit per acre were gathered from that district. He dealt briefly with the peach, nectarine, pear, and orange, and said that the object should be to build up the tree and furnishings. The three great factors in productiveness were manuring, cultivation, and pruning.

MINDARIE, October 2nd.—Mr. F. W. Witt read a paper on homestead planning, in which he advocated the selection of a suitable site of about 10 acres. The house should be placed on the west side, the stable on the eastern side opening to the east, and the implement shed on the southern side, opening to the south to avoid the sun shining on the implements. On the north side he would erect the barn and other small buildings. The blacksmith's shop, which was almost a necessity, should be adjacent to the implement shed. The buildings should be of stone, roofed with iron, as a protection against fire and because it enhanced the value of the farm. The bore should be on rising ground, as near the house as possible. There should be a small garden near the house, and sugar gums should be planted to set off the appearance of the place. Mr. J. W. G. Mann considered that iron roofs were too expensive at present rates. Mr. E. L. Parker preferred that the stable should open towards the east and that the bore should not be too close to the stable. Mr. F. Johnson liked to be able to see his horses feeding from the back door of his house. The buildings should not be too close together, because of the danger of fire, but they should all face the one way. He preferred iron roofs to straw and they looked neater.

NETHERTON, August 12th.—Mr. C. M. Wilkin read a paper on fallowing, and recommended first of all close attention to the fitness of the plough. He preferred a heavy fallowing to a light skim plough, because the work was rough and heavy. The depth should be 3in. or 4in., and there should be a fair amount of draught to pull out all the stumps possible, and break as many roots as possible. Fallowing should be done in June, July, and August, when the ground was wet, and then left in that state for three months. In April it should be broken up with the tine cultivator, then drilled and harrowed, the operations being finished by the end of May if possible.

STIRLING'S WELL, August 5th.—Mr. R. C. Daw read a paper, "Sheep on the Farm," in which he recommended the Leicester or Shropshire cross, but declared that on no account should Vermonts or wrinkled sheep be kept in cold, damp places, because they were not good doers, and were very difficult to shear. The Crossbred would fatten where the Merino would only just exist. Cross-breds were marketable much sooner than Merinos, and generally realised higher prices.

September 9th.—Mr. P. Ridge read a paper dealing with the preservation of the natural growth of the farm, in which he advocated leaving some of the timber on the holding for shelter for stock. The mallee country, when denuded of its timber, was liable to suffer severely from drift, which would be counteracted if belts of timber were allowed to remain, a plan which would also improve the appearance of the country. Plenty of timber should be allowed to stand around the homestead as a breakwind and a check against sandstorms in the summer time.

WALKERIE, September 15th.—Mr. H. Lehmann read a paper on cincturing vines. He said that he had tried many methods, but strongly advocated the double cut, removing a narrow strip of bark and causing a wound, which healed rapidly and did not gum. He found that cincturing sultanas had increased the yield considerably, and as far as he could see, had not injured the vines.

SOUTH AND HILLS DISTRICT.

BLACKWOOD (Average annual rainfall, 27in. to 29in.).

September 18th.—Present: 15 members and one visitor.

PIGS IN THE ORCHARD.—Mr. L. Sullivan, in a paper dealing with this subject, said he preferred to turn the pigs loose in the orchard, although it was necessary to enclose the area with netting. In that way labor was saved and the pigs gathered fallen apples and other fruit themselves. By that means the fruits which had codlin moth were consumed by the pig and the grub was destroyed. Troughs should be placed at convenient spots in the orchard, where a mixture of pollard and water might be provided as a drink. When all the fallen fruit had been cleared up, the pigs could be shut up and fed well for two or three weeks before being marketed.

IRRIGATION.—Mr. D. R. Williams read a paper on irrigation, in the course of which he said that if a profuse growth was desired the watering should be continuous. Subterranean water always contained a quantity, more or less, of mineral salts which were injurious to plant life. In using river water he had frequently noticed that towards the end of summer there was more soda in the water than earlier in the season. Irrigation by sprinklers was hardly practicable, because in an orchard, of say 20 acres, the cost of fittings would be very great. The most practical method was to run plough furrows along the least line of fall, in order to guard against the washing away of the earth. The furrows should always be cultivated in again after the watering, because, if left open, the sun would soon dry out the moisture which had been put in and leave the place as hard as ever. A big head of water was required for flooding, and when water was no object this was cheapest, but where water had to be pumped and it was necessary to prevent waste, a sprinkler was better. It did not do, however, to sprinkle all crops, tomatoes especially, as they were liable to crack. Lettuces in summer rotted if sprinkled.

CYGNET RIVER.

October 5th.—Present: eight members.

POULTRY.—The keeping of poultry on Kangaroo Island, either on a large scale or as a sideline, should prove profitable, observed Mr. A. C. Osterstock, in a paper on poultry. Should a large number be kept, incubation should be adopted, which would dispense with the keeping of heavy birds, light breeds being the best layers. Brooders should be made portable, with protection from winds, and should be provided with warmth, either sunshine or artificial. Chickens under three weeks should be fed mostly on crushed grain, because soft food often caused many ailments. A few sunflower seeds, well cooked meat, and green stuff were a valuable change. Poultry houses should be built on well drained land, free from stagnant pools. They should be supplied with scratching litter and all roosts should be built on one level. From eight to ten hens should be kept with each rooster for breeding purposes. If fewer hens were kept to one rooster they would fall off in laying, and if more, the eggs would not be fertilised, and either would not hatch or the chickens would be weak. Weak and sickly chickens would never make strong layers. Poultry should be housed comfortably, given plenty of exercise and changes of food to achieve the best results. Feeding twice a day was sufficient when grass was available. Grain scattered in scratching litter in the morning would promote exercise. Mash should be fed in the evening, because it was more easily digested. Mr. A. J. Wetherspoon favored the heavier breeds, because they laid a fair quantity of eggs and were good table birds. Mr. C. S. Miller preferred the original Langshan as the farmers' fowl, because 3ft. wire netting would keep them in. They laid a fair number of eggs and made good table birds. Mr. H. T. Noske stated that hens set on the ground produced better and stronger chickens than if set in boxes. A cross between the Silver Wyandotte and the Leghorn

produced good layers and really good mothers. If hens were set off the ground the eggs required damping to get the best results.

MILANG.

September 9th.—Present: 48 members and four visitors.

FODDER CROPS.—Cape barley, said Mr. H. Overall, in a paper on fodder crops, would, with fair conditions, grow more quickly than any other grain, and it would pay well if the land were heavy enough to fallow. He recommended drilling both ways, with ¾bush. per acre each way. He had sown and fed off with cows a seven-acre paddock for 10 years, and the paddock was very little the worse for its 10 years' cropping. The barley crop provided something for the winter months and, except in very dry years, there would be enough natural grass for the stock in spring. In regard to lucerne, where the watering had to be done by means of windmills, sandy land was best because it would grow with less water, was less liable to attacks of lucerne flea, and grew much later into the winter than on heavy soil. With a mill on a 6in. pump, lifting water about 12ft., and watering two acres, he managed, by keeping the mill going continuously for six months out of the 12, to obtain four or five cuts from it, and then feed it off for about three months. He recommended stirring up the land well with a sharp-tined cultivator and drilling in a good dressing of super. before the wet season was over, to give the lucerne a start for the summer. With proper attention lucerne would give a splendid supply of summer feed. Another useful crop to grow was mangolds (long red). That came on when the lucerne was nearly finished. On a small patch too salt for lucerne, he had grown eight successive crops, and was still obtaining good results, the best returns being from that portion which received the overflow from the lucerne watering. It would be advisable, however, to have two pieces of land and plant them alternately, because there were often mangolds growing when the land should be prepared for the next crop. The land should be worked down fine on top, in order that the hand drill could be worked easily. Mangolds would stand any quantity of manure. A large amount of feed for cows could be obtained by picking off the outside leaves when well grown. Mr. W. Saltmarsh said that mangolds were good feed for all stock. Mr. Moran said that rape, if fed to cows, would taint the produce. Mr. W. E. Richards always turned the cows on to the rape after milking, and it had no ill effects.

URAIDLA AND SUMMERTOWN (Average annual rainfall, 44.35in.).

September 4th.—Present: 15 members and two visitors.

LAYING DOWN LAND FOR GRASS.—There were in the hills districts thousands of acres, remarked Mr. W. Kenell, in a paper on laying down land to grass, which could, with their splendid rainfall, be converted into good pasturage. The advantages were great and the cost small, and subsequently, when the land was broken up, it was in the finest condition to grow corn or root crops. The land should be properly drained and clean. In new land, a crop of field peas or bare fallow should precede preparation for the grass crop. After midsummer, the plough and harrow should be used thoroughly and the ground worked to a fine tilth, and when seed time came, the surface should be made into a very fine seedbed, firm and level. It was almost impossible to overdo work with the harrow and roller. Sowing should take place at the end of summer or in early autumn, because if a spring sowing were followed by a hot dry summer, young plants would suffer. The seed should be sown alone or with corn, but in the latter case, the sowing of corn should be thin. A quiet day was desirable for sowing, and the seed should be bushed in or the lightest of harrows used and then rolled twice. The success of pasture depended upon skilful management. When a few inches in height, the young plants should be topped off with a keen scythe and then rolled; any bare spots should be re-sown. A liberal top manuring would be most advantageous. Large weeds which might crop up, should be cut out, and where the cattle left clumps of grass, they should be cut with the scythe and the young growth would be eaten down. There should be no stint of seed in sowing, and great care should be taken to procure good seed, which might cost more, but would prove the cheapest in the end. Of the perennial rye grasses, he liked the Italian, because of its rapid growth in the spring, and the succulent herbage which it produced in a few months and the eagerness the cattle manifested for it, but a great objection to it was that its rapid growth tended to smother the finer varieties. The most desirable was the perennial English rye

grass, because it was most reliable in its growth and fostered other varieties which were slow in maturing. Varieties most suitable in that locality were—Rough cocksfoot, Italian rye grass, English perennial rye grass, lucerne, cow grass, giant white clover, and prairie grass. About 40lbs. per acre of those varieties should be sown mixed. Mr. Johnson said that land in that district was too valuable to grow grass, but a small patch might be useful. Couch grass was a good hard fodder. Mr. Hunt said that there was plenty of land in the district on which grain could be profitably grown.

CHERRY GARDENS, October 10th.—Mr. K. Jacobs read a paper entitled "Home Methods of Drying Apples and Pears," in which he recommended careful picking of the fruit to be dried, because bruises in the dried fruit showed as black spots. They should be peeled, cut in four or six pieces and the core removed with a sharp knife. The pieces should be placed on wire netting or threaded on string and placed in the sun to dry. They should be taken in at night or covered over, because the wet spoiled them. The pieces should be kept from touching anything solid or touching each other. Three or four days sufficed for drying. When dry they should be packed away in a tin or case and kept in a dry place. In answer to questions, Mr. Jacobs said the varieties he used were—Apples, White Australia and Dunn's Seedling; and pears, Duchess and Vicar of Wakefield.

IRONBANK, October 7th.—Mr. C. Morgan delivered an address on tomato culture and urged the necessity for procuring good seed, which should be sown in small beds or boxes, in which a layer of manure should be placed first and then a layer of soil, in which the seeds should be planted. When the plants were up, and the rough leaves formed, they should be pricked out into beds, prepared in the same way as for seed. For early tomatoes the seed should be sown in July. The seed beds required to be damp. When the plants were 4in. to 6in. high they should be planted out into rows 4ft. each way, but 3ft. would be sufficient if staked. Mr. William Coats had pruned and staked his plants during three years, and found the practice very profitable, but he was not prepared to say that any sort of tomato would stand pruning and staking. The stakes should be 5ft. in height.

LONGWOOD, September 9th.—The meeting was held at the homestead of Mr. E. W. Beythien. The poultry plant was inspected, Mr. Beythien the while taking an opportunity of explaining his method of handling and feeding the birds. Mash was fed in the evening and grain thrown into the scratching pens overnight. Green feed constituted the midday meal. There were between 900 and 1,000 birds on the place, the cost of feeding per month being estimated at £14.

MORPHETT VALE, August 18th.—Mr. A. C. Pocock read a paper, "Breeding and Feeding Stock," in which he emphasised the principle that to be a successful breeder of stock a man must feed them properly. As a rule the more important lines, viz., horses, sheep, and cattle received a fair amount of attention, but the minor class, pigs, fowls, and calves were deserving of more consideration than they received.

PORT ELLIOT, September 16th.—A discussion took place on grasses and fodder crops, with special reference to light soils. Mr. P. R. Cudmore said that rye was one of the best early crops for sheep on scrub lands that had been cleared. It was agreed that fertilisers were necessary in growing fodder in that district.

STRATHALBYN, October 10th.—Mr. F. W. Allison read a paper on working petrol engines with kerosene, in which he said that with a kerosene attachment, petrol engines could be run more cheaply with kerosene than petrol. Mr. J. Saunders read a paper on pig raising, in which he described the good points and qualifications of the boar and sow and the feeding of the latter when she had farrowed.

SOUTH-EAST DISTRICT.

GLENCOE (Average annual rainfall, 33.84in.).

August 14th.—Present: six members.

THE ORCHARD ON THE FARM.—Limiting his observations to the Glencoe district, Mr. J. T. Halliday read a paper dealing with the establishment of an orchard on the farm. The orchard block should be as near the homestead as possible, and the

land should be ploughed two or three times, as deeply as possible, the deeper the better in order to permit the main roots to go down, an essential in the production of a strong tree and good fruit. Before planting, all the damaged roots should be pruned off with the cut slanting underneath. The hole should only be sufficiently deep to take the tree to the same depth as it was in the nursery. The custom of digging a hole two or three feet deep in heavy, hard soils was the cause of poor trees and small fruit, because the root, in striking out, came in contact with the hard bank of the hole, and being unable to penetrate it, trouble ensued. He preferred planting the trees 16ft. apart each way, which gave 196 trees to the acre. In that way the trees sheltered each other and there were not so many windfalls. With proper pruning to keep the tree short and sturdy, not only would a better class of fruit be obtained, but double the quantity. He had gathered five cases of fruit from trees only six feet through, and he had been able to gather all the fruit from the ground. The varieties he recommended were: Early—Emperor Alexander and Gravenstein; and for export, Jonathan, Rome Beauty, Dunn's Seedling, Cleopatra, and London Pippin. Mr. J. Dow considered Glencoe land too dear for commercial fruit-growing, but he believed that the stringybark ranges surrounding Glencoe would prove splendid orchard land. Mr. Halliday said that he had planted half an acre with apples, and regretted that he had not planted 10 acres, because there was no more profitable land about.

GLENCOE (Average annual rainfall, 33.84in.).

September 18th.—Present: seven members.

CARE AND MANAGEMENT OF HORSES.—In an address on the care and management of horses, Mr. J. Riddoch said that for a farm horse he considered the Clydesdale the best, but as a number of mares in that district were on the light side it might be an advantage to have a Shire stallion to give bone and weight to the progeny. His experience was that the tendency was for stock to become light and weedy. A foal should be handled at six months and taught to be led and be tied up, but it should not be petted or it would become tricky. Horses should be broken in at 2½ years, but only given light work, because a horse was not fully developed until five years old. He preferred an open bridle for breaking in, but winkers should be used as soon as the horse was quiet. Teamsters should carry whips, because it was much better to give a horse the whip than to be continually jerking its mouth to urge it on. A young horse, if not inclined to start, should not be led, but should be compelled to start when spoken to, even if it were necessary to use the whip. The system of coupling teams with ropes from the bit to the next horse's hames was superior to coupling at the bits, because the horses were kept even in the team, and they did not jerk each other's mouths. Horses should be fed and watered regularly, and should be induced to drink before feeding. Horses should never be worked with sore shoulders. If fed properly and worked fairly they should keep in good health. Mr. F. A. Telfer believed in breaking in at 2½ years, and considered that a horse was then fit for any ordinary farm work. He stable fed his horses, grooming them at night, after they had dried off the sweat. He fed them on the best of chaff. Mr. J. T. Halliday had fed his horses on straw chaff, with some grain added. He did not feed when he knocked off for the day, but allowed the horses out to roll and feed about in the paddock until bed time, when he called them up and fed them on chaff, and his horses had never done better. For heavy work a horse broken in at five years would do five years' more work than if broken in at four years. Mr. A. Dow had not fed his horses on chaff at night time that season, and they were almost too fat now. Mr. T. F. Gratwick considered that horses needed plenty of good water, especially during hot weather.

KONGORONG.

October 10th.—Present: nine members.

MIXED FARMING.—A paper on mixed farming was read by Mr. E. E. Morrison, who said that that district was ideal for that purpose. Sheep should be kept to feed off early crops and keep down weeds. Pigs were very profitable and it would pay to feed grain to them when the market was dull. Poultry and cows were most profitable if properly cared for and selected. Mr. W. A. Aslin had tried all branches of farming and there was profit in every one. There should be a butter or cheese factory in the district. Mr. A. C. Just emphasised the value of keeping poultry, and said that at Parafield the hens had averaged 8s. 1d. per

annum profit. It paid to feed cows well. He had doubled his returns by improved feeding. Mr. S. C. Atkin said that a holding could not really be regarded as a farm in that district unless it was a mixed farm. Pigs paid well and every portion of the carcass could be utilised.

CROSSBRED SHEEP IN KONGOKONG.—Mr. N. J. Houston read a short paper on Crossbred sheep in Kongorong, in which he advocated the Lincoln-Merino cross. They did best in that district and were most profitable. The lambs matured very quickly and withstood the cold climate of that district better than any other breed. They were not troubled with burr or thistles, and the wool, though long, was beautifully clean. Mr. W. A. Aslin found that Crossbreds did better in that district, even if a little coarse in the wool. Mr. T. C. Atkin considered that lambs dropped in September did best. Late lambs paid very well. In answer to questions, Mr. Houston said that on the Mount Schank Estate it was claimed that the Dorset Horn was one of the best sheep for fattening. He did not think that Comebacks did as well as Crossbreds. Mr. A. C. Just was averse to mating young ewes in January, but preferred later on, because young ewes were so timid and frightened of the foxes and ran away from their lambs if scared, whilst old ewes protected their lambs.

KYBYBOLITE (Average annual rainfall, 22in.).

September 7th.—Present: 12 members.

SUMMER CROPS.—Mr. L. S. Davie read a paper entitled "Summer Crops," as follows:—The principle underlying the successful growing of summer crops is that without irrigation there must be cultivation, and it is the recognition of this condition which makes all the difference between success and failure in districts suitable to their growth. The average monthly rainfall in this district for the growing period of summer crops is as follows:—November, 171 points; December, 134 points; January, 50 points; and February 87 points, making a total for the four months of 442 points. This amount in itself would be very inadequate for these crops grown in the hottest time of the year, but by means of cultivation, we can conserve, and make very good use of the ample winter rains, perhaps a good deal more than make up for the harm that excess of water may do at that period by consistent success in growing suitable summer crops. In writing this paper, I have no intention of enumerating the different summer crops which may or may not do well with us. I want to bring before you a few facts in connection with their cultivation in general, and more particularly to deal with the growing of kale. I am convinced that the great value of this plant to this locality has been conclusively demonstrated, it having been grown at the farm for several years with consistently good results. Particulars of the area sown last spring are very convincing in view of the fact that the driest summer on record was experienced, and yet the crop was wonderfully profitable, comparing well with previous experiences. The feeding of this crop, the seeding of which was completed on October 12th, 1915, has been as follows:—Up to September 6th, 1916, the 58 acres sown have carried exactly one sheep to the acre for each day. Taking into consideration the fact that the dryness of the summer made it undesirable to feed before May, thus allowing the plants to reach their full vigor, and that this long unproductive period has been included in the figures, the average of stock carried has been very good, although not up to what it could have been, as I have not been able to feed this crop up to its carrying capacity during the last two months. Recently I have been stocking three sheep to the acre, and have now increased to six, and I am not checking the growth, let alone eating it back; therefore it can be seen that the average number of sheep per day which is carried will steadily increase during the rest of the time which the land carries the crop, as the whole of that time will be productive, whereas the first two months were not. In the preparation of the land for kale or other summer crops I recommend that it be ploughed early in September or, in case of wet conditions, as early as possible. This would mean perhaps using the earliest fallow, but as the summer crops generally are fallow crops (of course kale is not) nothing is lost by this practice. By breaking up at the earliest possible date, the loss of soil moisture by evaporation is minimised, and the subsequent working will depend upon what is necessary to break up the formation of any surface crust, and produce the fine tilth necessary when sowing small seed. I think that frequent harrowings will in most cases produce the best condition of tilth without resort to

any other implement after the plough. In sowing the kale last year I gave three harrowings before the drill and two after, but, of course, the thing is to produce the desired seed bed, and the style of implements that does it does not matter. A well-packed undersoil and a very fine surface tilth are the conditions desired, and if the land has been well prepared, the seeding can be carried out at the rate of 1lb. of seed to the acre, sown with a special drill, or mixed with the super. or bonedust in the ordinary drill, but, in the case of super. particularly, never before the day that it is sown. If the soil conditions are not really good, a slightly larger quantity, say 1¼lbs. per acre, will allow for some loss through bad germination. A proper condition of soil moisture is desirable at seeding, but should there be barely sufficient, the seed is fairly hardy, and germination will extend over several weeks with good results. However, if sown at the end of September, or shortly afterwards, there will be little danger of a poor germination through lack of moisture. The seeding must be done in rows, the usual practice being in every third hoe of the drill, thus allowing for the absolutely essential cultivation. The manuring must, of course, depend upon the farmer's capabilities, but the production will justify an equal expenditure with a cereal crop. The first cultivation must be made as soon as the rows can be plainly distinguished. This will eliminate weeds and leave the surface loose. Thereafter cultivations are only necessary when a surface crust has formed. The general practice of cultivation is by means of a Planet Junior. The kale crop, when properly handled, will last over two years, therefore, by growing a certain area, say 20 acres each year, in conjunction with early-sown oats for feeding purposes which could afterwards be left for hay if desired, as the kale will keep the sheep busy, keeping it from going to seed in the spring, the carrying capacity of the farm will be greatly increased. This heavier stocking of the land will tend to the more rapid improvement of its fertility, and thus there is a double source of increased profit, firstly from the greater number of stock, and secondly in the greater yields from the improved land. In feeding the kale, a commencement should not be made before the plant has become well established and of good growth. After that care must be taken not to feed down so hard as to let the sheep damage the buds in the axils of the leaves, *i.e.*, between the base of the leaf stalk and the main stem of the plant. It is from these buds that the new leaves will come. Feeding should be carried out throughout the winter, because during that season the mature leaves will die back quickly and waste if not used. It will also be found wise to feed hard in August because the plant will make such rapid growth in the spring that unless constantly fed back, it will run to seed, a contingency that should be avoided. I would advise keeping the crop fed right down regularly throughout the spring and summer, taking care not to damage the buds before mentioned. Maize, sorghum, and such plants can be successfully grown here in all but perhaps very exceptional seasons, but they must receive proper cultivation, for once they are started, that is the whole secret of success. It must be remembered that these seeds require hot weather to germinate them, and they will quickly spoil if sown too early. To guard against loss of seed it would be well to keep it until the next year rather than put it into the ground when there is insufficient soil moisture for immediate germination.

NARACOORTE (Average annual rainfall, 22.60in.).

August 12th.—Present: 25 members.

VEGETABLES: THEIR GROWTH, DISEASES, AND PESTS.—Mr. Johnstone contributed a paper. "The first element to the successful cultivation of the cabbage," he said "is a good and fairly rich seed bed, so that the growing plants may vegetate quickly and strongly. The next element is a good and deeply cultivated plot, wherein to transplant them. Cabbages and cauliflowers are voracious feeding plants, and require a fast growth without check. The manure is best given to them in a fresh state. Mark out the ground in 2ft. rows, and, having done so, commence by digging out the first row to a spit in depth, putting the soil where the operator intends to finish the work; then with fresh stable and cow manure line the open trench to a thickness of a few inches. Stir with a fork the manure into the bottom of the trench, and, if possible, incorporate it with the substrata. Then proceed to open the second trench, filling up the first with soil. Having done so, plant out the young cabbages 18in. apart, and so on to the finish. Then with the transported soil fill up the last trench, and plant the last line. The ground between the rows can be dug afterwards, or when the young plants have begun to grow

They are attacked by insects, parasites, and grubs, but as to organic disease, if they are grown quickly they will be healthy. Shortly after the operation of transplantation, they may be attacked by the brown grub. The grubs are best destroyed by hand from around the stem of the beheaded plant. Scratch away the soil, where the pest will invariably be found. Then there are the slug and the snail. As they commit their depredations in the dark they may be effectually cleared by dusting after sunset with atmospheric slacked lime, or equal quantities of wood ashes and lime. If mildew appears, dust with sulphur and stir the ground between the rows in order to put more growth into the plants and aerate the soil, and, in that way, draw off some of the superabundant moisture. Then there is the cabbage fly, or aphis. As this pest breathes through the epidermis it follows that the most expeditious way to get rid of it is by choking, therefore, when the leaves are damp, dust the plants well with soot, lime, or wood ashes. The caterpillars also may be effectually dealt with in the same manner. The wire-worm attacks the plants at the roots, and it is a troublesome pest to get rid of. Digging in spent lime from a gas works is a good cure. Here we cannot get that, but to apply water poured from off gas tar will be found a good substitute; as also to dig in refuse from an acetylene gas plant. But, as a general preventive at digging time, and where wire-worms are found, use a good dressing of agricultural lime." He then described various insect pests and their treatment, and continued: —"My few notes with regard to cultivation may apply to the whole of the brassica, only that cauliflower, broccoli, and Brussels sprouts should be given a distance of 2ft. in the rows, and in the case of large-growing cabbages, such as Henderson's Succession and the Drumhead varieties, they also should be given a distance of 2ft., but in the case of such as Enfield or London Market 18in. will be sufficient. I have here a table of analysis of the ash of the leaves which is given as a guide to a complete manure for the cabbage. It is as follows:—Potash, 11.70; soda, 0.42; lime, 20.97; magnesia, 5.94; oxide of iron, 0.60; phos. acid, 12.37; sulphuric do., 21.48; chlorine, 5.77; silica, 0.75. From the above it will be seen that lime, soda, and sulphuric acid occur in nearly equal amounts, and form the principal inorganic constituents of the plant, therefore, in addition to the organic manure which supplies the humus, I would add a dusting of lime and superphosphate—a plan I employ if ingredients are at hand, and find the crop respond in yield for the extra care given to its requirements. During growth the ground should be frequently stirred with a Dutch hoe or fork to aerate the soil. Keep down weeds and so enable the crop to get the full benefit of the manure, that the maturing season may not be prolonged, for the quicker the growth the better and more succulent will be the produce. Of course, those remarks apply to the garden cultivation only of the vegetable. If grown on the farm by the acre the manure must be spread on the ground, and with the ploughing become incorporated with the soil. A double-moulded plough should be used. In such case, the ground would be ploughed first in an opposite direction to that of the rows of the future crop. Then the double-moulded plough would be used to open the rows in which the manure would be spread, then return between those rows, in which operation the manure would be covered, and the ground made ready for the plants. In either case there should be deep cultivation. If potato growers followed this system of the double ploughing and double-moulded plough, they would, I am sure, increase their returns by a very considerable amount. As most proprietors of a garden grow peas, a few remarks on the cultivation of this most nutritious vegetable may not be amiss. The pea (*Pisum sativum*) is supposed to be a native of the Levant, where the common grey field pea—supposed to be the parent of garden varieties—is found wild. A rich calcareous friable loam is a ideal soil for its successful cultivation, and if lime is not a principal ingredient of its composition it may be added in the form of lime, chalk, or gypsum. It also should be deep, so that the roots may penetrate easily downwards to obtain moisture in time of drought, otherwise the foliage will be liable to attacks from mildew, and, if the plants once get too dry while in flower the pods will not fill. I invariably put the crop in trenches, putting the manure—preferably half rotted—about 8in. below the surface. The rows should be a little wider apart than the height to which the particular variety is said to grow, and, if the material is available, it always pays to stick them or run them up on wire-netting. If artificial manure be used care must be taken that it is well down from the seed, because if brought too early in contact with the radicle, as it strikes downwards,

it is apt to burn. It may be generally stated that the young plant for a considerable time of its growth draws its sustenance from the seed pea, and until that has been used, does not really require manure. I have found in practice that the best results are got from the use of good rotted farmyard manure dug well into the bottom of the trench. Sow the seed from 3in. to 4in. in the ground. As a member of the family leguminosæ, all of which are rich in food, either for man or beast—as instance lucerne, lentils, clover, tares, lupins, &c.—the pea probably comes nearer to a complete food for man than any other product of the garden, and according to analysis it is richer in the dry state than in the green. It is subjected to the attacks of birds, mice, mildew, and those pests common to the other vegetables mentioned, and the same remedies will apply; in the case of mice, a dusting of red lead over the seed will stop them, a covering of sand will also stop them from smelling the pea.

SANDALWOOD.

September 9th.—Present: 17 members.

PIGS ON THE FARM.—After describing the different breeds of pigs, Mr. C. A. Ritchie, in a paper entitled "Pigs on the Farm," recommended the Mid York. It was important that the pigs should have comfortable quarters, built of stone if possible. Each house should be 9ft. x 9ft., to give the sow room to move about and lie down, without overlaying any of her young. He found pigs very cleanly in their habits, only fouling one corner of the sand floor. Therefore there was no necessity for paving, which made it essential to supply bedding. The only spot requiring paving was that on which the feeding trough stood. The yard for breeding pigs should be as large as it was possible to make it, or else an opening should be left so that the young might have a scamper. If the yard was small, the sow should also be allowed to have a run for an hour or so every day. If a stump house were built, he would advise banking it up with sand to keep the draught off the young pigs, which otherwise were apt to get chilled and die. The pigs should be fed regularly on ground barley or wheat, with skim milk and house refuse. It was wasteful to feed whole grain to pigs because so much of it passed through them undigested. A small, shallow feeding dish should be provided for the litter when a fortnight old, and they should be given scalded bran with a little pollard and skim milk, because that tended to relieve the strain on the sow of suckling a big litter. The dish should be placed outside the yard, so that the sow could not get it. An allowance of bran in the sow's feed greatly increased the milk supply.

MOUNT GAMBIER, September 16th.—The meeting discussed at great length the proceedings at the congress in Adelaide. At a previous meeting Mr. T. C. Ellis contributed a paper dealing with the suggested measures to prevent the slaughter of female stock. He contended that the best interests of the industry were conserved by allowing the breeder a free hand.

SANDALWOOD, October 7th.—Mr. D. J. Hood read a paper on the most suitable machinery for harvest work in that district, recommending the twine binder for dealing with the hay crop and the stripper for the wheat crop, although in land from which the stumps had been removed, and where the crop was fairly even and a good even team could be obtained, a harvester could be used to advantage. For cleaning wheat, a hand power winnower driven by a 1½-h.p. petrol engine was suitable to deal with 800 bags. If there were more than that amount, a power winnower could be used to advantage.